Year-book

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Published Weekly.] ESTABLISHED 1856. [Price Sixpence.

The Engineer.

Established 1856. Registered as a Newspaper.

OFFICE FOR ADVERTISEMENTS AND PUBLICATION, 33, NORFOLK STREET, STRAND, LONDON, W.C.

VOL. CXVII—No. 3032] LONDON: FRIDAY EVENING, FEBRUARY 6, 1914. [PRICE SIXPENCE

Full particulars of Subscription and Advertisement rates are contained in "THE ENGINEER" DIRECTORY, an Abridged Index to the Editorial Columns, as well as "The Engineer" Iron and Steel Trades Directory and Buyers' Guide. A copy sent free on application to

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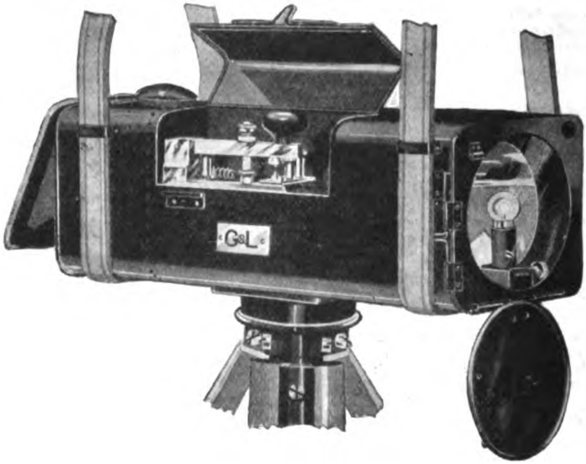

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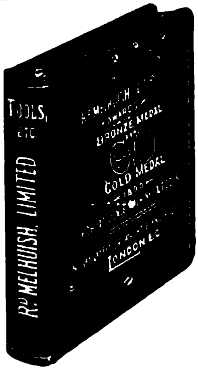

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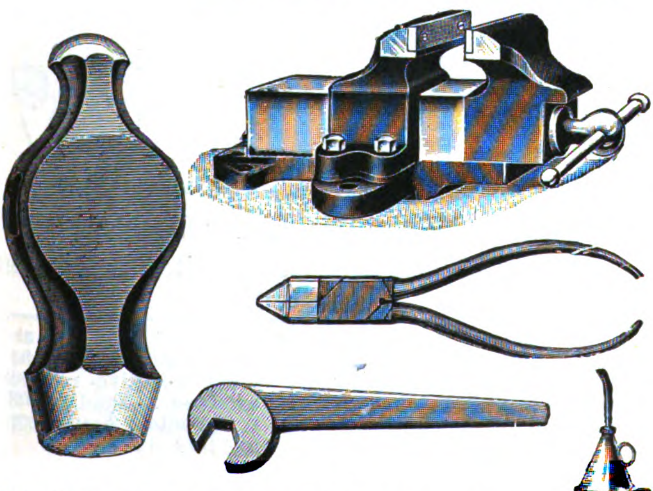

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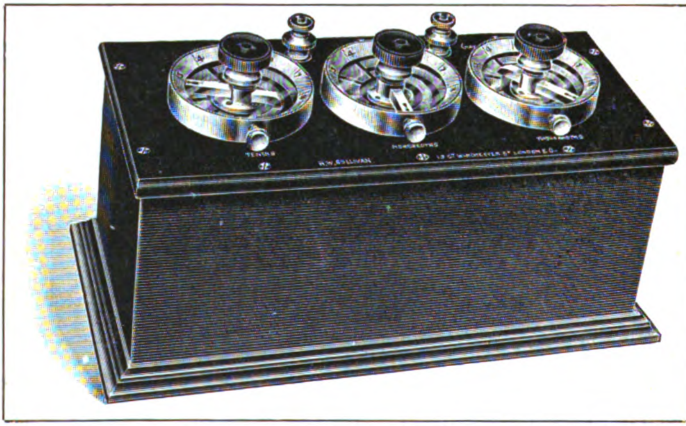

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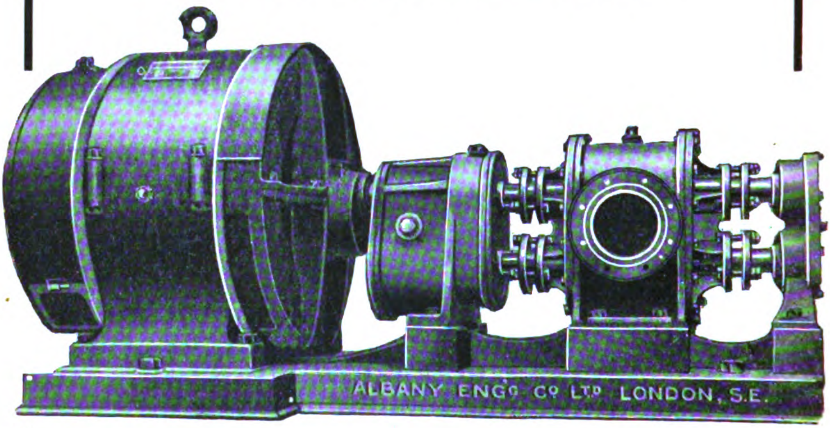

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NOTE.—The land and ship stations are not included in this index. They are grouped together under the countries in which the land stations are, or to which the ships belong, and these countries are arranged in the section in alphabetical order. Names not in the index should be sought under "Biographical Notices," where they are arranged in alphabetical order.

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INDEX TO ADVERTISERS.

PREFACE

THE great interest shown in the first issue of the YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY is brought home to us by an overflowing letterbag and a demand for copies which far exceeded our anticipations. On the whole, our readers have been most kindly towards the deficiencies of which we were probably more conscious than they, and in the compilation of the present volume we have profited by the helpful suggestions and criticisms offered to us by readers and the Press. To enable us to deal with the immense variety of matters relating to wireless telegraphy and telephony we have been obliged to increase the number of pages in the present volume by no fewer than 300. The aim has been so concisely to compile the information available that, whether he desires to know the wireless stations of the world or the rates for a message, to understand the laws and regulations governing wireless telegraphy, or to learn the progress of experimental work, the reader will be able to discover it with a minimum of effort. Further suggestions will be welcomed. In the meantime, we have to render thanks to those who have been more than kind to our virtues, while not blind to our faults.

THE EDITOR.

Marconi House, Strand,
London, W.C.
March, 1914.

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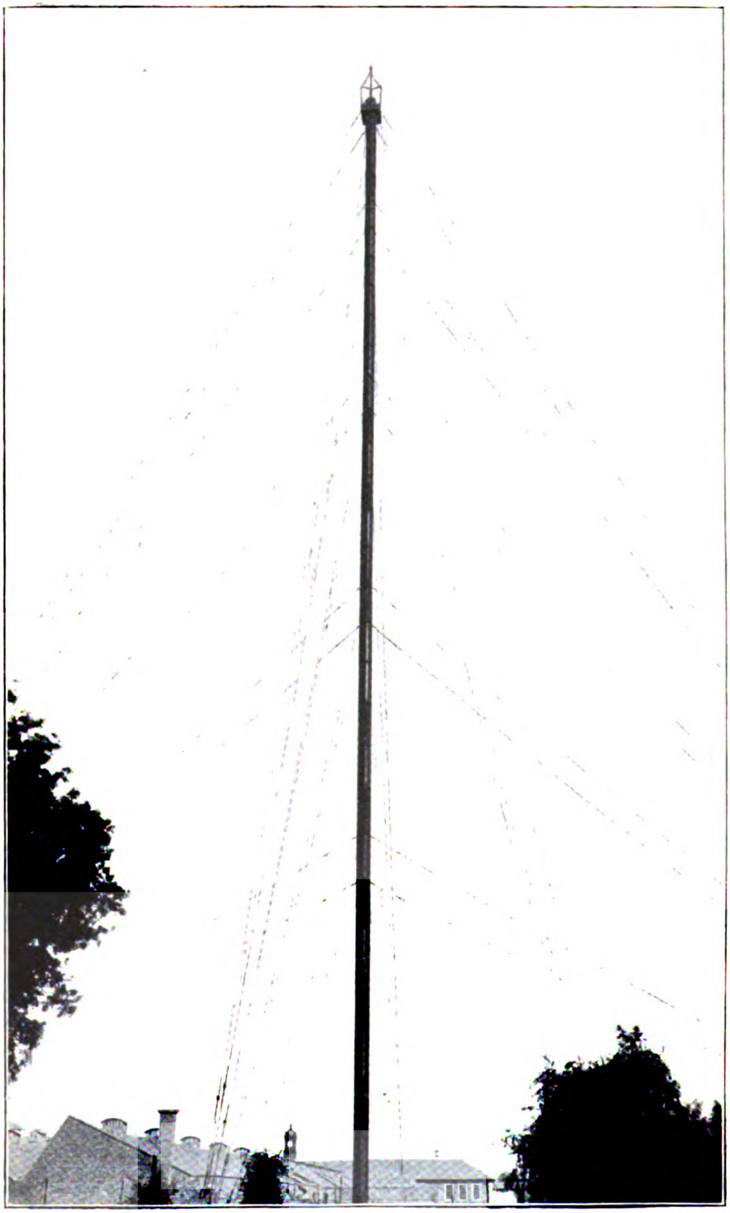

The 450-ft. Mast at the Marconi Works, Chelmsford.

[*To face page 3*

JANUARY, 191

New Year's Day. Bank H
Ship messages accepted at Brit
Manchester Ship Canal opened, 1

2nd Sunday after Christmas

Epiphany. Twelfth day.

British Penny Postage establish
1st Sunday after Epiphany
Hilary Law Sittings begin.

Sandwich Islands discovered, 1

Benjamin Franklin born, 1706
2nd Sunday after Epiphany

"Republic" wrecked. Passer
3rd Sunday after Epiphany

Capitulation of Paris, 1871.

"Great Eastern" steamer lau

JANUARY, 1914

1	Th	New Year's Day. Bank Holiday in Scotland. Ship messages accepted at British post offices, 190 Manchester Ship Canal opened, 1894.
2	F	
3	S	
4	S	**2nd Sunday after Christmas**
5	M	
6	T	**Epiphany.** Twelfth day.
7	W	
8	Th	
9	F	
10	S	British Penny Postage established, 1840.
11	S	**1st Sunday after Epiphany**
12	M	Hilary Law Sittings begin.
13	T	
14	W	
15	Th	Sandwich Islands discovered, 1778.
16	F	
17	S	Benjamin Franklin born, 1706; died, April 17th, 1790.
18	S	**2nd Sunday after Epiphany**
19	M	
20	T	
21	W	
22	Th	
23	F	"Republic" wrecked. Passengers and crew saved.
24	S	
25	S	**3rd Sunday after Epiphany**
26	M	
27	T	
28	W	Capitulation of Paris, 1871.
29	Th	
30	F	
31	S	"Great Eastern" steamer launched, 1858.

FEBRUARY, 1914

1	S	**4th Sunday after Epiphany**
2	M	
3	T	
4	W	
5	Th	
6	F	
7	S	
8	S	**Septuagesima Sunday**
9	M	
10	T	
11	W	Thomas Alva Edison born, 1847.
12	Th	
13	F	
14	S	
15	S	**Sexagesima Sunday** Sir Wm. Preece born, 1834; died, November 6th, 1913.
16	M	
17	T	
18	W	
19	Th	Alessandro Volta born, 1745; died, March 5th, 1827.
20	F	
21	S	British Radiotelegraph Action decided, 1912.
22	S	**Quinquagesima Sunday.** SHROVE SUNDAY. George Washington born, 1732; died, Dec. 14th, 1799. Prof. H. Hertz born, 1857; died, January 1st, 1894.
23	M	
24	T	SHROVE TUESDAY.
25	W	**Ash Wednesday**
26	Th	"Birkenhead" lost, 1852.
27	F	
28	S	

MARCH, 1914

1	S	**Quadragesima** Wireless Service inaugurated Hawaiian Islands, 1901.
2	M	
3	T	
4	W	Inauguration Day, U.S.A.
5	Th	
6	F	
7	S	
8	S	**2nd Sunday in Lent**
9	M	
10	T	
11	W	
12	Th	John Frederick Daniell born, 1790; died, March 13th, 1845.
13	F	
14	S	Millwall Docks opened, 1868.
15	S	**3rd Sunday in Lent**
16	M	Georg Simon Ohm born, 1787; died, July 7th, 1854.
17	T	ST. PATRICK'S DAY.
18	W	Grover Cleveland born, 1837.
19	Th	
20	F	Sir Isaac Newton died, 1727; born, December 25th (O.S.), 1642.
21	S	
22	S	**4th Sunday in Lent**
23	M	
24	T	H.M.S. "Eurydice" foundered, 1878.
25	W	
26	Th	
27	F	English Channel spanned by wireless, 1899.
28	S	
29	S	**5th Sunday in Lent**
30	M	First Transatlantic Marconigram published in *The Times*, 1903.
31	T	Robert Wilhelm Bunsen born, 1811; died, August 16th, 1899.

APRIL, 1914

1	W	"Marconigraph" first published, 1911; "Wireless World," 1913.
2	Th	
3	F	
4	S	
5	**S**	**Palm Sunday**
6	M	Peary reached North Pole, 1909.
7	T	
8	W	HILARY LAW SITTINGS END.
9	Th	
10	F	**Good Friday**
11	S	American Civil War began, 1861.
12	**S**	**Easter Day**
13	M	**Easter Monday**
14	T	**Easter Tuesday** President Lincoln assassinated, 1865.
15	W	"Titanic" disaster, 1912; 1,513 lives lost.
16	Th	
17	F	Benjamin Franklin died, 1790; born, January 17th, 1706.
18	S	
19	**S**	**1st Sunday after Easter**
20	M	
21	T	EASTER LAW SITTINGS BEGIN.
22	W	
23	Th	Shakespeare born, 1564.
24	F	Compagnie Française Maritime et Coloniale de Telegraphie Sans Fil formed, 1903.
25	S	Commendatore G. Marconi, LL.D., D.Sc., born, 1874. Marconi International Marine Communication Co., Ltd., formed, 1900.
26	**S**	**2nd Sunday after Easter** "Four Sevens" Patent, 1900.
27	M	Samuel F. B. Morse born, 1791; died, 1872.
28	T	
29	W	
30	Th	Johann Karl Friedrich born, 1777; died, February 23rd, 1855.

MAY, 1914

1	F	Union with Scotland, 170
2	S	
3	**S**	**3rd Sunday after Easter**
4	M	
5	T	Napoleon I. died, 1821.
6	W	KING'S ACCESSION (1910).
7	Th	
8	F	Treaty on Alabama Claims, 1871.
9	S	
10	**S**	**4th Sunday after Easter**
11	M	
12	T	
13	W	Hudson's Bay Company founded, 1670. Joseph Henry died, 1878 ; born December 17th, 1797.
14	Th	
15	F	
16	S	
17	**S**	**Rogation Sunday**
18	M	New Eddystone Lighthouse opened, 1882.
19	T	
20	W	Christopher Columbus died, 1506.
21	Th	**Ascension Day** "Lake Champlain," first British merchant vessel with wireless, left Liverpool, 1901. Manchester Ship Canal opened, 1894.
22	F	
23	S	
24	**S**	**Sunday after Ascension** EMPIRE DAY. Queen Victoria born, 1819.
25	M	Lloyd's Incorporated, 1871.
26	T	
27	W	
28	Th	
29	F	EASTER LAW SITTINGS END.
30	S	Decoration Day, U.S.A.
31	**S**	**Whit Sunday** Union Day, South Africa.

JUNE, 1914

1	M	**Whit Monday.** BANK HOLIDAY.
2	T	**Whit Tuesday** First British Wireless Patent granted, 1896.
3	W	THE KING'S BIRTHDAY (1865). First paid marconigram sent by Lord Kelvin, 1898.
4	Th	International Radiotelegraphic Conference opened, London, 1912.
5	F	
6	S	
7	**S**	**Trinity Sunday** Union of Sweden and Norway dissolved, 1905.
8	M	
9	T	TRINITY LAW SITTINGS BEGIN.
10	W	
11	Th	
12	F	Sir Oliver Lodge born, 1851.
13	S	
14	**S**	**1st Sunday after Trinity** Flag Day, U.S.A.
15	M	Magna Charta, 1215.
16	T	
17	W	Sir W. Crookes born, 1832.
18	Th	War with U.S.A., 1812. Waterloo, 1815.
19	F	"Alabama" sunk by "Kearsage," 1864.
20	S	
21	**S**	**2nd Sunday after Trinity**
22	M	
23	T	
24	W	
25	Th	
26	F	Lord Kelvin born, 1824.
27	S	
28	**S**	**3rd Sunday after Trinity**
29	M	
30	T	Tower Bridge opened, 1894.

JULY, 1914

1	W	DOMINION DAY (Canada), 1867.
2	Th	
3	F	
4	S	British Admiralty decide to take Marconi apparatus, 1900. INDEPENDENCE DAY, U.S.A.
5	S	**4th Sunday after Trinity** International Radiotelegraphic Convention signed, London, 1912.
6	M	
7	T	
8	W	
9	Th	
10	F	
11	S	Sir Wm. Robert Grove born, 1811 ; died, August 1st, 1896.
12	S	**5th Sunday after Trinity**
13	M	Berlin Treaty, 1878.
14	T	Bastille stormed, 1789. French Holiday.
15	W	ST. SWITHIN'S DAY.
16	Th	
17	F	
18	S	Barry Docks opened, 1889.
19	S	**6th Sunday after Trinity**
20	M	Wireless Telegraph & Signal Co., Ltd., formed, 1897 (name changed to Marconi's Wireless Telegraph Co., Ltd., March 24th, 1900).
21	T	
22	W	
23	Th	
24	F	
25	S	
26	S	**7th Sunday after Trinity**
27	M	Bank of England founded, 1694.
28	T	" Alabama " sailed from the Mersey, 1862.
29	W	
30	Th	
31	F	TRINITY LAW SITTINGS END.

AUGUST, 1914

1	S	LAMMAS DAY.
2	**S**	**8th Sunday after Trinity**
3	M	BANK HOLIDAY.
		Columbus's first voyage, 1492.
4	T	East India Docks opened, 1806.
		First International Conference on Wireless Telegraphy met at Berlin, 1903.
		Southampton Docks opened, 1895.
5	W	First British American Cable worked, 1858.
6	Th	
7	F	
8	S	
9	**S**	**9th Sunday after Trinity**
10	M	Royal Observatory, Greenwich, founded, 1675.
11	T	
12	W	
13	Th	
14	F	
15	S	Wireless Telegraph Act of Great Britain passed, 1904.
16	**S**	**10th Sunday after Trinity**
		First steam journey to India, 1825.
17	M	
18	T	
19	W	
20	Th	
21	F	
22	S	Wireless News Message Service to liners inaugurated, 1903.
23	**S**	**11th Sunday after Trinity**
24	M	
25	T	
26	W	West India Docks opened, 1802.
27	Th	First hydrogen balloon ascent, 1783.
28	F	Loss of the " Royal George," 1782.
29	S	
30	**S**	**12th Sunday after Trinity**
31	M	

SEPTEMBER, 1914

1	T	
2	W	Board of Trade (Great Britain) constituted, 1786.
3	Th	
4	F	Proclamation of French Republic, 1870.
5	S	Malta taken, 1805.
6	S	13th Sunday after Trinity "Mayflower" sailed, 1620.
7	M	
8	T	Sebastopol taken, 1855.
9	W	Luigi Galvani born, 1737; died, December 4th, 1798.
10	Th	
11	F	
12	S	
13	S	14th Sunday after Trinity Quebec taken, 1759.
14	M	
15	T	Liverpool and Manchester Railway opened, 1830.
16	W	
17	Th	
18	F	
19	S	
20	S	15th Sunday after Trinity
21	M	
22	T	Michael Faraday born, 1791; died, August 25th, 1867.
23	W	
24	Th	
25	F	
26	S	
27	S	16th Sunday after Trinity
28	M	Strassburg capitulated, 1870.
29	T	
30	W	

OCTOBER, 1914

1	Th	
2	F	
3	S	International Radiotelegraphic Conference met at Berlin, 1906.
4	S	**17th Sunday after Trinity**
5	M	Republic of Portugal proclaimed, 1910.
6	T	
7	W	Marconi Press Agency formed, 1908.
8	Th	Russian Company of Wireless Telegraphy and Telephony formed, 1908.
9	F	
10	S	Panama Canal completed, 1913.
11	S	**18th Sunday after Trinity** Camperdown, 1797. Volturno burnt in Mid-Atlantic. Saved 521.
12	M	America discovered, 1492. Robert Stephenson died, 1859.
13	T	First Aeroplane flight in U.S.A., 1893.
14	W	
15	Th	The Gregorian Calendar introduced, 1582.
16	F	
17	S	Transatlantic stations opened for public service, 1907.
18	S	**19th Sunday after Trinity**
19	M	
20	T	
21	W	TRAFALGAR DAY. Death of Lord Nelson, 1805.
22	Th	
23	F	Edouard Branly born, 1844.
24	S	
25	S	**20th Sunday after Trinity** St. Katherine Docks opened, 1828.
26	M	Compagnie de Telegraphie Sans Fil formed, 1904; became Société Anonyme de Telegraphie Sans Fil, 1913.
27	T	
28	W	Present Royal Exchange opened, 1844.
29	Th	George Morland, painter, died, 1804.
30	F	Admiral Lord Dundonald died, 1860.
31	S	ALL HALLOW EVE. Sir Joseph Wilson Swan born, 1828.

NOVEMBER, 1914

1	S	**21st Sunday after Trinity** East India Company abolished, 1858.
2	M	
3	T	International Radiotelegraphic Convention, Berlin, signed, 1906.
4	W	
5	Th	
6	F	
7	S	*London Gazette* established, 1665.
8	S	**22nd Sunday after Trinity** Marconi's Wireless Telegraph Co. of America incorporated, 1899.
9	M	Lord Mayor's Day. King Edward VII. born, 1841.
10	T	Martin Luther born, 1483 ; died, February 18th, 1546.
11	W	MARTINMAS.
12	Th	Lord Rayleigh born, 1842.
13	F	Professor Clerk Maxwell born, 1831 ; died, November 5th, 1879.
14	S	
15	S	**23rd Sunday after Trinity** *Transatlantic Times* published at sea, 1899.
16	M	Inauguration of the Suez Canal, 1869.
17	T	
18	W	
19	Th	Ferdinand de Lesseps born, 1805 ; died, December 7th, 1894.
20	F	
21	S	
22	S	**24th Sunday after Trinity**
23	M	
24	T	
25	W	
26	Th	
27	F	
28	S	
29	S	**1st Sunday in Advent**
30	M	William Gilbert died, November 30th, 1603 ; born, 1540.

DECEMBER, 1914

1	T	
2	W	
3	Th	
4	F	
5	S	
6	**S**	**2nd Sunday in Advent**
7	M	
8	T	
9	W	John Milton born, 1608; died, November 8th, 1674.
10	Th	Royal Academy instituted, 1768.
11	F	
12	S	First wireless signals transmitted across the Atlantic, 1901.
13	**S**	**3rd Sunday in Advent** "Delhi" disaster, 1911.
14	M	
15	T	
16	W	Amundsen reached the South Pole, 1911.
17	Th	First Transatlantic message sent, 1902. Sir Humphrey Davy born, 1778; died, May 29th, 1829.
18	F	
19	S	
20	**S**	**4th Sunday in Advent**
21	M	
22	T	
23	W	
24	Th	Wireless communication with East Goodwin lightship, 1898. Spanish Marconi Company formed, 1910.
25	F	**Christmas Day**
26	S	BOXING DAY. Bank Holiday.
27	**S**	**1st Sunday after Christmas**
28	M	
29	T	
30	W	
31	Th	Charter granted to East India Co., 1600.

JEWISH CALENDAR

(A.M. 5674 and part of A.M. 5675).

A.M. 5674.		A.D. 1913.		
Tishri	1	October	2	Rosh Hashanah (New Year).
,,	2	,,	3	Second day of New Year.
,,	4	,,	5	Fast of Guedaliah.
,,	10	,,	11	Yom Kippur (Day of Atonement).
,,	15	,,	16	Feast of Tabernacles.
,,	21	,,	22	Hosana Rabah.
,,	22	,,	23	Feast of the 8th day.
,,	23	,,	24	Rejoicing of the Law.
Hesvan	1	November	1	New Moon.
Kislev	1	,,	30	New Moon.
,,	25	December	24	Dedication of the Temple.
Tebet	1	,,	30	New Moon.
		A.D. 1914.		
Tebet	10	January	8	Fast. Siege of Jerusalem.
Sebat	1	,,	28	New Moon.
Adar	1	February	27	New Moon.
,,	13	March	11	Fast of Esther.
,,	14	,,	12	Purim.
,,	15	,,	13	Shusan.
Nisan	1	,,	28	New Moon.
,,	15	April	11	Festival of Passover.
,,	16	,,	12	,, ,, 2nd day.
,,	21	,,	17	,, ,, 7th day.
,,	22	,,	18	Festival of Passover ends.
Iyar	1	,,	27	New Moon.
Sivan	1	May	26	New Moon.
,,	6	,,	31	Festival of Weeks.
Tamuz	1	June	25	New Moon.
,,	17	July	12	Fast of Tamuz.
Ab	1	,,	24	New Moon.
,,	9	August	2	Fast of Ab.
Elul	1	,,	23	New Moon.
A.M. 5675.				
Tishri	1	September	21	Rosh Hashanah (New Year).
,,	3	,,	23	Fast of Guedaliah.
,,	10	,,	30	Yom Kippur (Day of Atonement).
,,	15	October	5	Feast of Tabernacles.
,,	21	,,	11	Hosana Rabah.
,,	22	,,	12	Feast of the 8th day.
,,	23	,,	13	Rejoicing of the Law.
Hesvan	1	,,	21	New Moon.
Kislev	1	November	19	New Moon.
,,	25	December	13	Dedication of the Temple.
Tebet	1	,,	18	New Moon.
,,	10	,,	27	Fast. Siege of Jerusalem.

NOTE.—All Jewish Sabbaths and Festivals commence the previous Evening at Sunset.

MUHAMMADAN CALENDAR

(1332nd Year of Hejira, A.D. 1913-14).

Year of Hejira 1332.	A.D. 1913.	
Muharram	November	30
Saphar	December	30
	A.D. 1914.	
Rabia I.	January	28
Rabia II.	February	27
Jomada I.	March	28
Jomada II.	April	27
Rajab	May	26

Year of Hejira 1332.	A.D. 1914.	
Shaaban	June	25
Ramadán	July	24
Shawall	August	23
Dulkaada	September	21
Dulheggia	October	21
1333.		
Muharram	November	19
Saphar	December	19

OLD STYLE CALENDAR, 1914.

(Used in Russia and the Balkan States).

A.D. 1914. A.M. 7422.

Old Style.		Certain Holy Days.	New Style.	
January	1	Circumcision	January	14
,,	6	Theophany (Epiphany)	,,	19
February	2	Hypapante	February	15
,,	16	Carnival Sunday	March	1
,,	23	First Sunday in Lent	,,	8
March	9	Forty Martyrs	,,	22
,,	25	Annunciation of Theotokos	April	7
,,	30	Palm Sunday	,,	12
April	4	Great Friday	,,	17
,,	6	Holy Pasch	,,	19
,,	23	St. George	May	6
May	9	St. Nicolas	,,	22
,,	14	Coronation of the Emperor*	,,	27
,,	15	Ascension	,,	28
,,	25	Pentecost	June	7
,,	26	Holy Ghost	,,	8
June	29	Peter and Paul, Chief Apostles	July	12
August	1	First day of Fast of Theotokos	August	14
,,	6	Transfiguration	,,	19
,,	15	Repose of Theotokos (Assumption)	,,	28
,,	30	St. Alexander (Nevsky)*	September	12
September	8	Nativity of Theotokos	,,	21
,,	14	Exaltation of the Cross	,,	27
October	1	Patronage of Theotokos*	October	14
,,	21	Accession of the Emperor*	November	3
November	15	First day Fast of the Nativity	,,	28
,,	21	Entrance of Theotokos	December	4
December	6	St. Nicolas	,,	19
,,	9	Conception of Theotokos	,,	22
,,	25	Nativity	January	7

* Peculiar to Russia.

The Rt. Hon. C. E. Hobhouse, M.P.
Postmaster-General,
Great Britain and Ireland.

[To face page 1.

...RD OF THE DEVEL...
WIRELESS TELEGR...

1831.

...EL FARADAY discovered e...
...between two entirely separate c...

1837.

...patent for an electric teleg...
...(London) and by Morse (U...

1838.

...Steinheil (Munich) discovered t...
...suggested that the remaining m...
...be dispensed with entirely, and...
...established.

1840.

...Henry (U.S.A.) first produced h...
...and pointed out that the dischar...
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1842.

...B. Morse made wireless experime...
...through water across Washington Ca...

...Henry noticed that a single elect...
...thrown into a circuit of wire in an...
...steel needles included in a parallel c...
...underground thirty feet below wit...
...was one of many observers prior t...
...effects due to electric sparks...
...which were commonly ascribed to...
...induction.

1843.

...Bowman Lindsay, of Dundee, sugge...
...provide stations of not more than...
...across the Atlantic, there would...

RECORD OF THE DEVELOPMENT OF WIRELESS TELEGRAPHY

1831.

MICHAEL FARADAY discovered electro-magnetic induction between two entirely separate circuits.

1837.

The first patent for an electric telegraph taken out by Cooke and Wheatstone (London) and by Morse (U.S.A.).

1838.

K. A. Steinheil (Munich) discovered the use of the earth return, and suggested that the remaining metallic portion of the circuit might be dispensed with entirely, and a system of wireless telegraphy established.

1840.

Joseph Henry (U.S.A.) first produced high-frequency electric oscillations, and pointed out that the discharge of a condenser is oscillatory.

1842.

S. F. B. Morse made wireless experiments by electric conduction through water across Washington Canal and across wide rivers.

Joseph Henry noticed that a single electric spark about one inch long thrown into a circuit of wire in an upper room could magnetise steel needles included in a parallel circuit of wire placed in a cellar underground thirty feet below with two floors intervening. He was one of many observers prior to Hertz who had noticed curious effects due to electric sparks produced at a distance, which were commonly ascribed to ordinary electro-magnetic induction.

1843.

James Bowman Lindsay, of Dundee, suggested that if it were possible to provide stations of not more than twenty miles apart all the way across the Atlantic, there would be no need to lay any cable.

1845.

Lindsay began making experiments in 1845 across the river Tay, his method being to transmit messages by means of electricity or magnetism through and across the water without submerged wires, the water being utilised as the conducting medium.

1849.

J. W. Wilkins revived the same suggestion for wireless telegraphy.

Dr. O'Shaughnessy (afterwards Sir William O'Shaughnessy Brooke) succeeded in passing intelligible signals without any metallic conduction across the River Hooghly, 4,200 ft. wide, in India, but he found the cost of power prohibitive.

1859.

Bowman Lindsay gave a demonstration of his conduction system to the British Association Meeting, at which Michael Faraday and Sir William Thompson (Lord Kelvin) were both present.

William H. Preece (afterwards Sir William) was deputed by the Electric Telegraph Company to report on Lindsay's system.

1862.

John Heyworth patented a method of conveying electric signals without the intervention of any continuous artificial conductor.

Cromwell Varley tried this method, but found it a failure.

1867.

James Clerk Maxwell read a paper before the Royal Society, in which he laid down the theory of electro-magnetism, which he developed more fully in 1873, in his great treatise on electricity and magnetism. He predicted the existence of the electric waves that are now used in wireless telegraphy.

1870.

Von Bezold discovered that oscillations set up by a condenser discharge in a conductor give rise to interference phenomena.

1872.

Henry Highton made various experiments across the River Thames with Morse's method.

1879.

David E. Hughes discovered the phenomena on which depends the action of coherers, which many years later were used in early electric-wave signalling. He found that a tube of metallic filings was sensitive to electric sparks made in its vicinity, and he was able to obtain such effects on a tube connected to a battery and a telephone at a distance of five hundred yards.

1880.

John Trowbridge, of Harvard, systematically studied the problem of propagation of electric current through "earth," either soil or water, and he found that signalling might be carried on over considerable distances by electric conduction through the earth or water between places not metallically connected.

1882.

Graham Bell experimented with Trowbridge's method on the Potomac River, when signals were detected at a distance of 1½ miles.

Sir William H. Preece made an experiment, using Morse's method to connect the Isle of Wight with the mainland across the Solent on two occasions during the failure of the submarine cable in the Solent.

1883.

Willoughby Smith, in a paper before the Institution of Civil Engineers, London, suggested that electric induction might be employed for railway signalling.

Heinrich Rudolph Hertz became *privat docent* at Kiel, where he began studies in Maxwell's electro-magnetic theory.

G. F. Fitzgerald suggested a method of producing electro-magnetic waves in space by the discharge of a condenser.

1885.

Thomas A. Edison, with the assistance of Messrs. Gilliland, Phelps, and W. Smith, worked out a system of communication between railway stations and moving trains by means of induction and without the use of conducting wires.

Sir W. H. Preece made experiments at Newcastle-on-Tyne which showed that in two completely insulated circuits of square form, each side being 440 yards, placed a quarter of a mile apart, telephonic speech was conveyed from one to the other by induction.

1886.

A. E. Dolbear, of Tuft's College, Boston, patented a plan for establishing wireless communication by means of two insulated elevated plates, but there is no evidence that the method proposed by him did, or could, effect the transmission of signals between stations separated by any distance.

1887.

Heinrich Rudolph Hertz discovered the progressive propagation of electro-magnetic action through space, and was able to measure the length and velocity of electro-magnetic waves, and to show that in the transverse nature of their vibration, and their susceptibility to refraction and polarisation, they are in complete accordance with the waves of light and heat.

Hertz employed as a detector of the electric wave a simple nearly closed circuit of wire, called the "Hertz Resonator," but it was subsequently discovered that the metallic microphone of Hughes was a far more sensitive detector.

A. W. Heaviside established communication by telephonic speech between the surface of the earth and the subterranean galleries of the Broomhill Collieries, 350 ft. deep, by laying above and below ground two complete metallic circuits, each about 2½ miles in length, and parallel to each other.

1889.

Elihu Thompson suggested that electric waves were particularly suitable for the transmission of signals through fogs and material objects.

1891.

John Trowbridge suggested that by means of magnetic induction between two separate and completely insulated circuits communication could be effected between distances.

1892.

Edouard Branly devised an appliance for detecting electromagnetic waves, which was known as a "coherer." He discovered that these waves had the power of affecting the electric conductivity of materials when in the state of a powder.

Sir W. H. Preece adopted a method which united both conduction and induction as the means of affecting one circuit by the current in another. In this way he established communica-

tion between two points on the Bristol Channel, and at Lochness, in Scotland.

C. A. Stevenson, of the Northern Lighthouse Board, Edinburgh, advocated the use of an inductive system for communication between the mainland and isolated lighthouses.

1894.

E. Rathenau of Berlin experimented with a conductive system of wireless telegraphy, and signalled through three miles of water.

1895.

Mr. G. Marconi's investigations led him to the conclusion that Hertzian waves could be used for telegraphing without wires, and he made important experiments at his father's home in Italy.

Willoughby Smith established communication by conduction with the lighthouse on the Fastnet.

1896.

In February Mr. Marconi came to England. His first experiments in this country were conducted at Westbourne Park.

On June 2nd Mr. Marconi lodged his application for the first British Patent for Wireless Telegraphy, No. 12,039 of 1896.

In July of that year he was introduced to Sir William H. Preece, the Chief Electrical Engineer of the Post Office, at whose request Mr. Marconi conducted experiments before the officials of the Post Office, first over a distance of about 100 yards and afterwards between the General Post Office and the Savings Bank Department in Queen Victoria Street. Shortly afterwards a series of trials were conducted by Mr. Marconi before Post Office officials and naval and military officers on Salisbury Plain, when communication was successfully established over a distance of 1¾ miles.

On December 11th, 1896, Sir William H. Preece delivered a lecture at Toynbee Hall on "Telegraphy without Wires." Mr. Marconi was present at this lecture, and conducted the experiments.

1897.

In March, 1897, Mr. Marconi gave a demonstration on Salisbury Plain before the representatives of various Government Departments, communication being established over a distance of 4 miles.

In May further trials were made across the Bristol Channel

between Lavernock and Flatholm, a distance of over 3 miles; and on the 13th of that month communication was established between Lavernock Point and Brean Down, at distance of about 8 miles. Professor Slaby, a German scientist, was present at these trials.

In July Mr. Marconi was called to Italy by the Italian Minister of Marine, and gave a demonstration of his invention in the Admiralty buildings at Rome, and before King Humbert at the Royal Palace of the Quirinal. Between July 10th and 18th trials were made at Spezia at the request of the Italian Government, and on the 17th and 18th communication was successfully made and maintained between the Arsenal of San Bartolomeo at Spezia and the Italian cruiser *San Martin* at sea, at distances up to 16 k.m.

On July 20th, 1897, the Wireless Telegraph and Signal Company, Limited, was incorporated, with a capital of £100,000, to acquire Mr. Marconi's patents in all countries except Italy and her dependencies.

On August 27th, 1897, a lecture was given by Professor Slaby at the Sailors' Home, Potsdam, on Wireless Telegraphy, before the Emperor and Empress of Germany and the King of Spain.

In September and October further experiments were conducted by Mr. Marconi on Salisbury Plain for Post Office officials. Experiments were also carried out by officials of the Post Office at Dover. Receiving apparatus was erected by a Post Office official at Bath, and signals were received from Salisbury, 34 miles distant.

In November the first Marconi Station was erected at the Needles, Alum Bay, Isle of Wight. Experiments were conducted between that Station and Madeira House, South Cliff, Bournemouth, where Mr. Marconi was residing at the time, a distance of 14½ miles.

In December tests were made between the Station at Alum Bay and a steamer, the height of the mast being about 60 ft., and readable signals were obtained up to a distance of 18 miles, Captain Kennedy, R.E., being present.

1898.

In May, 1898, experiments were carried out by Mr. Marconi between St. Thomas's Hospital and the House of Commons. In the same month experiments were carried out at the request of

Lloyd's between Ballycastle and Rathlin Island, a distance of 7½ miles.

On June 3rd Lord Kelvin visited the Needles Station and sent from there, to his friend Sir George Stokes, the first paid Marconigram.

On July 20th and 22nd the events of the Kingstown Regatta in Dublin were reported by wireless telegraphy for the Dublin *Daily Express* from the steamer *Flying Huntress,* equipped with the Marconi system.

On August 3rd wireless telegraphic communication was established between the Royal yacht *Osborne* and Ladywood Cottage, Osborne, in order that Queen Victoria might communicate with the Prince of Wales, then suffering from the results of an accident to his knee. Constant and uninterrupted communication was maintained during the sixteen days the system was in use.

In September the installation at Madeira House, Bournemouth, was removed to Poole Harbour, Dorset.

Under arrangement with the Trinity House officials the utility and value of wireless telegraphy as a means of communication between lightships and the shore was demonstrated by the installation in December, 1898, of the East Goodwin Lightship and the South Foreland Lighthouse. The intervening distance was 12 miles. Communication was first established on Christmas Eve, and was continuously maintained for more than a year.

1899.

During a gale in January, 1899, a heavy sea struck the East Goodwin Lightship, carrying part of her bulwarks away. The mishap was reported by wireless telegraphy to Trinity House.

On March 2nd Mr. Marconi read a paper on Wireless Telegraphy at the Institution of Electrical Engineers.

On March 3rd the s.s. *R. F. Matthews* ran into the East Goodwin Lightship. The accident was reported by wireless telegraphy to the South Foreland Lighthouse, and lifeboats were promptly sent to the assistance of the lightship.

On March 27th communication was established across the Straits of Dover, between the Chalet d'Artois, Wimereux, near Boulogne, and the South Foreland Lighthouse.

During the naval manœuvres in July three British warships, the flagship *Alexandra* and the cruisers *Europa* and *Juno* were equipped with Marconi apparatus, and messages were correctly exchanged between these vessels at distances up to 74 nautical miles (about 85 land miles).

In September Marconi Stations were installed at Chelmsford and Dovercourt.

During the meetings of the British Association at Dover and of the Association Française pour l'Avancement de Science at Boulogne, in August, communication between the two societies was maintained by means of Marconi apparatus installed at the Dover Town Hall and at Wimereux.

The international yacht races between the *Shamrock* and the *Columbia,* which took place in September and October, 1899, were reported by wireless telegraphy for the *New York Herald.* After the conclusion of the races, series of trials were made at the request of the U.S.A. naval authorities between the cruiser *New York* and the battleship *Massachusetts,* signals being exchanged between the vessels at distances up to about 36 miles. On the return journey from America Mr. Marconi fitted the s.s. *St. Paul* with his apparatus, and on November 15th established communication with the Needles Station when 36 miles distant. Reports of the progress of the war in South Africa were telegraphed to the vessel, and were published in a leaflet entitled "The Transatlantic Times," printed on board the *St. Paul.*

In October, 1889, the War Office adopted the Marconi apparatus for use in the field in South Africa, and on November 2nd six of the company's electricians left for South Africa with six sets of Marconi apparatus. The apparatus proved of considerable service to the army and to the naval squadron in Delagoa Bay, to which several of the sets were subsequently transferred.

1900.

On February 2nd Mr. Marconi delivered a discourse on Wireless Telegraphy at the Royal Institution.

In March the Marconi system was adopted by the Norddeutscher Lloyd Steamship Co., and by agreement with the Marconi Co. Marconi apparatus was installed on the Borkum Riff Lightship and Borkum Lighthouse, and on board the R.M.S. *Kaiser Wilhelm der Grosse.*

On April 25th the Marconi International Marine Communication Company was incorporated with offices in London and Brussels, and agencies in Paris and Rome, for the maritime working of the Marconi system of wireless telegraphy.

On July 4th a contract was entered into by the Admiralty for the installation of the Marconi apparatus on certain of His Majesty's ships and at a number of coast stations. Twenty-six

(26) sets were subsequently installed on ships of His Majesty's Navy, and six (6) at Admiralty Coast Stations. In addition to these installations, the six installations supplied to the War Office for field operations in South Africa were transferred to His Majesty's Navy.

In October the erection of the High Power Station at Poldhu was commenced. The aerials were at first supported by 20 masts, each 210 ft. high. The erection of a similar station at Cape Cod, Mass., was commenced early in the following year.

In November, 1900, the Belgian Royal Mail Steam Packet *Princesse Clementine,* plying between Ostend and Dover, was fitted, and a Marconi Wireless Telegraph Station installed at La Panne, on the Belgian coast near Ostend.

The Marconi system was adopted by the Metropolitan Fire Brigade, and apparatus fitted at Mitcham Lane Station Box and Streatham Fire Station.

1901.

On January 1st, 1901, the *Princesse Clementine* reported the barque *Medora,* of Stockholm, waterlogged on Ratel Bank. A tug was promptly despatched from Ostend and the barque towed off.

On January 8th wireless telegraph experiments on the *Princesse Clementine* were carried out during a storm, communication being maintained the whole way from Ostend to Dover. On January 19th *Princesse Clementine* ran ashore at Mariakerke during a thick fog. News of the accident was conveyed to Ostend by wireless telegraphy.

In February communication was established between Niton Station, St. Catherines, I. of W., and the Lizard Station, a distance of 196 miles.

The Marconi system of wireless telegraphy was largely used during the voyage of the Duke and Duchess of York to Australia in 1901.

On March 1st a public Marconi Telegraph Service was inaugurated between five of the principal islands of the Hawaiian group, viz., Oahu, Kauai, Molaki, Maui, and Hawaii.

In April a demonstration of the Marconi system was carried out for the French Government, communication being successfully established and maintained for some time between a Station at Calvi, Corsica, and another at Antibes in the Riviera. The Prince of Monaco's yacht was also fitted with Marconi apparatus at the same time for the purpose of demonstrating to the delegates of the

"Congress International de l'Association de la Marine" the value of the Marconi system for maritime communication.

On May 15th, 1901, Mr. Marconi read a paper on Syntonic Wireless Telegraphy at the Royal Society of Arts, London.

The first British ship, the s.s. *Lake Champlain* (Beaver Line), was equipped by the Marconi Company with wireless telegraphic apparatus on May 21st, and about the same date the Marconi Company opened six coast stations in England and Ireland for communication with ships at sea as follows:—Crookhaven, Co. Cork; Rosslare, Co. Wexford; Holyhead; Withernsea, near Hull; Caister, near Yarmouth; North Foreland.

The masts at Poldhu were wrecked during a very heavy gale on September 20th, and the masts at Cape Cod shared a like fate in the November following. The masts were then replaced by four towers, 210 ft. high, built of timber.

On September 26th a 14 years' contract was made for the installation of the Marconi apparatus at ten of Lloyd's Signal Stations.

The Compagnie de Télégraphie sans Fil of Brussels was formed on October 26th to develop and work the Marconi system on the Continent.

Signals were received by Mr. Marconi at St. John's, Newfoundland, from Poldhu Station, Cornwall, a distance of 1,800 miles, across the Atlantic on December 12th and 13th.

1902.

Considerable progress in Transatlantic work was accomplished, and also in long-distance communication throughout Europe. In February Mr. Marconi received on board the s.s. *Philadelphia*, of the America Line, readable messages up to a distance of 1,551½ statute miles, and Morse signals up to a distance of 2,099 statute miles from Poldhu Station, Cornwall.

Mr. Marconi lectured on the "Progress of Electric Space Telegraphy" at the Royal Institution of Great Britain on June 13th.

On July 14th-16th Mr. Marconi received messages from Poldhu on the Italian battleship *Carlo Alberto,* lying at Cape Skagen, a distance of 800 miles; and at Kronstadt, 1,600 miles.

A demonstration was given before officials of the Dutch Government of Mr. Marconi's inventions, and the Colonial Premiers who were in England for King Edward's Coronation

witnessed a demonstration of the Marconi system on board the *Koh-i-nor.*

The Marconi Wireless Telegraph Company of Canada was formed on November 1st, and in December wireless messages were despatched by the Cape Breton Station from Mr. Marconi and from the Earl Minto to His Majesty King Edward VII. Mr. Marconi also sent a message to King Victor Emmanuel of Italy. Mr. Marconi was made a member of the Italian Order of Merit.

The Marconi Wireless Telegraph Company of America was established in this year.

1903.

President Roosevelt sent a Transatlantic message to King Edward *viâ* Cape Cod and Poldhu Stations on January 19th. High power and other stations were ordered by the Italian Government, and the Italian Senate and Chamber of Deputies tendered a vote of thanks to Mr. Marconi for the results obtained in the Italian Navy with wireless telegraphy.

The first Transatlantic Marconigram was published in *The Times* on March 30th.

The Compagnie Française Maritime and Coloniale de Télégraphie Sans Fil was formed on April 24th to operate the Marconi system in France.

An agreement was made on July 24th by the British Admiralty for the general use of the Marconi system in the Navy.

The first International Conference upon Wireless Telegraphy was held in Berlin on August 4th.

Mr. Marconi sailed from Liverpool on the s.s. *Lucania* on August 22nd, and during the voyage news messages were received daily.

The passengers of the Red Star Liner *Kroonland,* which was disabled on December 8th, 130 miles west of the Fastnet, were saved great inconvenience by wireless communication being established with the Marconi Station at Crookhaven.

Mr. Marconi was made a Knight of the Order of St. Anne of Russia.

1904.

On April 28th a contract was made by the Admiralty for the installation of a coast station at Guernsey.

A Wireless Telegraph Act was passed by the British Government on August 15th.

Meteorological information was supplied by wireless to the *Daily Telegraph.*

Accidents to s.s. *New York* and the s.s. *Friesland* early in the year were reported by wireless telegraphy.

In August an arrangement was made by the Postmaster-General whereby British post offices undertook the collection, transmission and delivery of long-distance and ship-to-shore messages on behalf of the Marconi Company.

1905.

Judgment given by Judge Townsend in New York on May 4th in favour of the Marconi Company in its action against the De Forest Wireless Telegraph Company for infringement of patents. On May 12th the Canadian Government ordered stations for Cape Sable (N.S.) and St. John (N.B.), and on May 30th instructions were given for five further lightships to be installed with wireless apparatus for Trinity House.

Erection of the Clifden High-Power Station (Ireland) was commenced in October.

Mr. Marconi was made a Civil Member of the Royal Order of Savoy.

In 1905 Mr. Marconi took out his patent for the horizontal directional aerial (No. 14,788), which marked a step of great importance in the progress of long-distance work.

1906.

A contract made by the British Post Office in May for the erection of stations at Tobermory and Loch Boisdale, Scotland, by the Marconi Company.

On August 4th the Argentine Marconi Company was formed to work the Marconi patents in Argentine and Uruguay.

In October and November an International Radiotelegraphic Conference was held at Berlin, and a convention was signed by the majority of the principal countries of the world.

1907.

Marconi Transatlantic Stations at Clifden and Glace Bay were opened for limited public service on October 17th.

1908.

Transatlantic Stations were opened to the general public for transmission of messages between the United Kingdom and the principal towns in Canada on February 3rd.

Mr. Marconi lectured on "The Commercial Application of Wireless Telegraphy" at Liverpool on February 24th.

The Russian Company of Wireless Telegraphs and Telephones was formed on October 8th.

1909.

The *Republic*, after collision with the s.s. *Florida* off the coast of the United States on January 23rd, succeeded in calling assistance by wireless, with the result that all her passengers and crew were saved before the vessel sank.

Mr. Marconi lectured before the Dutch Royal Institute of Engineers on May 1st and on December 11th.

The *Slavonia* was stranded in the Azores on June 10th, when the passengers and crew, numbering 410, were rescued from the wreck by the assistance of vessels summoned to her aid by wireless.

The Marconi British Coast Stations taken over by the Postmaster-General on September 29th, who was granted a licence to use the company's patents.

Mr. Marconi was awarded the Nobel Prize for Physics when he lectured at the Royal Academy of Science, Stockholm.

1910.

Mr. Marconi, *en route* for Buenos Aires on board the *Principessa Mafalda*, received messages from Clifden at a distance of 4,000 miles by day and 6,735 miles by night.

The patents of Professor Majorana for wireless telephony were acquired by Marconi's Wireless Telegraph Company.

The Compania Naciоñal de Telegrafia sin Hilos was formed on December 24th to operate the Marconi system in Spain.

1911.

On February 21st judgment was given in the action instituted in December, 1910, by the Marconi Company against the British Radiotelegraph and Telephone Company for infringement of their tuning patent No. 7777 of 1900. Mr. Justice Parker's decision was in favour of the Marconi Company, and he granted them a certificate of validity of their patent and an injunction, together with costs and damages.

A contract was made between the Marconi Company and the Canadian Government for operating of wireless telegraph stations in Canada for a period of 20 years.

Stations at Teneriffe, Cadiz, Barcelona, and Las Palmas, erected by Marconi Company, were opened for public business by the Compania Naciоñal de Telegrafia sin Hilos, the concessionaires of the public wireless telegraph service of Spain.

The Imperial Conference held in May approved the proposal that an Imperial Wireless Telegraph System should be created.

H.M.S. *Cornwall* reported by wireless as being ashore at Cape Sable (N.S.), and the Donaldson Liner *Saturnia* as having struck an iceberg 175 miles east of Belle Isle. Both vessels safely brought to port.

Mr. Marconi lectured on "Radiotelegraphy" at Royal Institution on June 2nd.

The P. and O. Liner *Delhi,* with the Duke and Duchess of Fife on board, was reported in distress off Cape Spartel on December 13th. Assistance was obtained by means of wireless and everyone was safely landed. The Lodge-Muirhead patents were acquired by the Marconi Company, and Sir Oliver Lodge became a scientific adviser to the company.

1912.

Early in the year, owing to the improved position of the Marconi Wireless Telegraph Company of America, through the transfer to it of the United Wireless Company's business, further capital was subscribed by the shareholders, sufficient to develop its projects for the erection of long-distance stations throughout the United States and elsewhere.

On January 27th the Aranjuez (Madrid), the central station of the Spanish wireless service, was opened by King Alfonso. Stations at Vigo and Soller were also opened during the year.

In February the Marconi Company secured the patents of Bellini and Tosi, including those for the wireless compass.

The disastrous loss of life occasioned by the wreck of the *Titanic* on April 15th was mitigated to some extent through the help secured by its wireless call, and, where all on board might have been drowned but for the assistance of wireless telegraphy, a considerable number of lives were saved.

Mr. Marconi, whilst in America, delivered an address on the "Progress of Wireless Telegraphy" before the New York Electrical Society on April 17th.

Owing to the rapid development of its business, Marconi's Wireless Telegraph Company transferred its offices in May to Marconi House, Strand, and larger works were built at Chelmsford.

The International Radiotelegraphic Conference, opened in London on June 4th, approved important regulations to secure uniformity of practice in Wireless Telegraphic Services.

The British Government entered into a contract in July with the Marconi Company for the erection of a chain of High-Power Wireless Telegraphic Stations, as recommended at the Imperial Conference held in 1911. When the contract was submitted for the ratification of the House of Commons it was referred to a Select Committee to report thereon.

The Marconi Wireless Telegraph Company of Canada was entrusted by the Dominion Government on September 17th with the working of the existing stations on the Great Lakes until 1931 and the erection of further stations. A similar arrangement was come to in December with the Newfoundland Government for stations at Belle Isle and on the Labrador coast.

On September 26th a regrettable accident befel Mr. Marconi whilst travelling by motor-car in Italy, with serious consequences to the great inventor's eyesight.

In September the Norwegian Government entered into a contract with the Marconi Company for the erection of a High-Power Station in Norway to communicate with a station to be erected by the Marconi Company at New York.

On November 12th assistance was called by wireless for the Pacific Steam Navigation Company's s.s. *Oravia,* on a rock off the Falkland Islands, and passengers and mails were saved before the vessel was lost.

Mr. Marconi was decorated with the Grand Cross of the Order of Alfonso XII., and made a Grand Officer of the Order of St. Maurice and Lazarus. In December an important contract was made by the Portuguese Government for the erection of Marconi Stations at Lisbon, Oporto, Azores, Madeira, and the Cape Verde Islands.

1913.

The past year has seen marked progress in the practical realisation of wireless telegraphy. The number of vessels of the mercantile marine now equipped with wireless installations has been vastly increased and many stations opened for communication with ships.

The Transatlantic stations at Carnarvon (Wales), New Jersey (U.S.A.), Stavanger (Norway), and elsewhere on which work was commenced during the past year are rapidly nearing completion. The construction of the high-power stations on the Pacific Coast of America has made considerable progress.

A number of special applications of wireless telegraphy have

been undertaken. The Governments of France and the United States have been experimenting between Paris and Washington, by wireless, in securing exact data for comparing the velocity of grounded electro-magnetic waves to that of light, and it is noteworthy that several organisations have taken steps towards almost world-wide simultaneous observations of signals and disturbances in such ways that the resulting data should be of vast assistance in arriving at and demonstrating accurate transmission theories. The military uses of wireless telegraphy have also undergone great development as the services during the Balkan wars show.

At the close of 1912 the British Parliament had under discussion an Imperial wireless scheme proposed by the Government and embracing stations on the Marconi system in England, Egypt, and the East African Protectorate, South Africa, India, and Singapore. On January 23rd the Postmaster-General, Mr. Herbert Samuel, appointed a committee presided over by the Rt. Hon. Lord Parker of Waddington "To consider and report on the merits of the existing systems of long-distance wireless telegraphy, and in particular as to their capacity for continuous communication for the distances required by the Imperial Chain." The committee issued their report on April 30th after having inspected various systems of wireless telegraphy that were in existence, and they reported that according to their investigation "The Marconi system is at present the only system of which it can be said with any certainty that it is capable of fulfilling the requirements of the Imperial Chain." The committee also reported that "the only continuous high-frequency generator we have yet seen tried with success over long distances is the Marconi continuous high-frequency machine." On July 2nd the Select Committee of the House of Commons decided not to pursue their inquiries further, and on July 4th Mr. Samuel made a statement in the House of Commons regarding a new contract with the Marconi Company for the Imperial Wireless Chain. The revised contract was debated in the House on August 8th, on which date the agreement with the company was ratified.

In January, the High Court of Justice of France delivered a judgment declaring the validity of all claims of the Marconi patent 305060, which corresponds with the "four sevens" patent.

The *Veronese* sailing from Liverpool for South America was wrecked on January 16th on the Boa Nova Rocks about half a mile outside Leixoes Harbour. The "S.O.S." signal was sent

out, and through the aid which this brought all but a few of the passengers were rescued.

On March 8th the *Scotia,* equipped with a Marconi wireless installation, left Dundee to patrol the waters of the North Atlantic and to collect information regarding the movement of ice in that region.

It was announced on April 12th that when on her way from South Africa to Australia, the battle-cruiser *New Zealand* was able to keep in simultaneous wireless communication between the two continents, enabling the respective Governors-General of South Africa and Australia to exchange greetings.

During the siege of Adrianople in the Balkan war a Marconi 1½ kw. set, which was shut up in the besieged city, enabled the army to keep in touch with the Turkish Government at Constantinople. During the time the city was invested over 450,000 words were transmitted to headquarters.

On October 11th, the *Volturno* was burnt in mid-Atlantic, and in response to the wireless appeal ten vessels came to the rescue of the *Volturno* and 521 lives were saved.

On October 4th the shareholders of Marconi's Wireless Telegraph Company authorised an increase of the company's capital, part of which increase was required for the acquisition of the rights throughout the world with the exception of Germany, of Dr. Rudolph Goldschmidt's high-frequency alternator, and his other wireless patents.

On September 29th a cargo steamer, the *Templemore,* on a voyage from Baltimore to Liverpool, caught fire shortly after leaving port. In answer to the S.O.S. signal all steamers in the vicinity came to the rescue, and the whole of the crew were saved before the vessel was abandoned.

The Wireless Society of London was formed in October, with Mr. Campbell Swinton as hon. president and Mr. F. Hope Jones as chairman.

On November 12th an International Conference for the purpose of considering means of saving life at sea was opened in London by the President of the Board of Trade. The conference lasted until January 19th, 1914, and the resolutions concerning wireless telegraphy which were agreed upon are reported elsewhere in this volume.

On November 24th the first practical trials with wireless apparatus on trains were made on board one of the trains belonging to the Delaware, Lackawanna and Western Railroad. These

trials were very successful. Miscellaneous news messages were transmitted and received on board the train from stations at Scranton and Binghamton and a news service was carried on. The stations were equipped by the American Marconi Company.

In November the Postmaster-General appointed a committee to consider how far and by what methods the State could make provision for research in the science of wireless telegraphy.

On June 28th Norwegian Storthing ratified a contract which the Government had entered into with the Marconi Company in September 1912 for the erection of a high-power Transatlantic Wireless Telegraph Station near Stavanger.

In August the Budget Commission of the French Chamber of Deputies framed a Bill proposing the establishment of a wireless telegraphy system between France and the French Colonies at an estimated cost of £631,800. The Bill provides for the erection of a station in the South of France which will communicate with chains of stations extending to the Far East, Africa, and South America, and to the Pacific. The stations in the Eastern chain comprise: Tunis, Djibouti, Pondichéry, Saigon, and Madagascar. In the African and South American chains it is proposed to erect stations in Morocco, St. Louis, Tombouctou, and Bangui. The Pacific chain will comprise the following stations: Morocco, St. Louis, Martinique, Tahiti, Marquises, Nauméa, and Saigon. A station will also be erected in the East of France to communicate with North America.

On November 25th Commander H. A. Edwards, who was at the head of the Bolivian Survey Commission appointed to determine the boundary line between Brazil and Bolivia reported that the Commission had been able to determine the difference of longitude between Mañaos and Porto Velho by means of exchange of wireless signals, the result being that the Commission were independent of chronometers during the journey between those two points.

The Roumanian Army during the second Balkan war was equipped with seven Marconi portable sets, which ensured regular radiotelegraphic communications between the headquarters and various Roumanian commanders in the field. Up to August 1st about 6,000 telegrams were handled and 120,000 words were dealt with.

The wireless station at Macquerie Island was the means of keeping Dr. Mawson, the Australian explorer, in touch with the outer world. A small journal, the "Adelie Blizzard," was established, the news being received by wireless.

WIRELESS TELEGRAPH LAWS AND REGULATIONS

THE main tendency of legislation affecting wireless telegraphy which came into operation during the past year has been in the direction of the compulsory equipment of certain classes of vessels. Following the example of the United States of America, other countries, notably Spain, New Zealand, the Argentine Republic, and Uruguay, have made legislation on these lines, and it has been known for some time past that the British Board of Trade propose to introduce a Bill in Parliament giving effect to the decision of the International Conference on Safety of Life at Sea regarding the compulsory equipment of steamers.

The movement in favour of wireless telegraph legislation may be said to date back to 1903, although prior to that, in 1899, the Marconi system had then reached a point of development when the Admiralty thought it desirable to obtain sets of the apparatus for trial, and two years later an agreement of a limited character was entered into between the Admiralty and the company for the supply of Marconi apparatus for naval use. In July, 1903, a further and more complete agreement was entered into. At that time the increasing use of wireless telegraphy for maritime purposes had raised questions of international interest, and it had become evident that on many points regarding the interchange of messages international agreement would be desirable.

A conference met at Berlin in August, 1903, on the invitation of the German Government. The outcome of that conference was that all the Powers, with the exception of Great Britain and Italy, agreed to certain proposals to be considered at a subsequent conference for the international regulation of wireless telegraphy. The British delegates had been instructed to maintain an attitude of reserve owing to the position in which wireless telegraphy was at that time placed in the United Kingdom, the fact being that in the then state of the law the Government had not that control over wireless telegraphy which would have enabled them to enforce the provisions of the Convention. The Wireless Telegraphy Act, which was passed in 1904 for two years only, and which was

renewed in 1906 without modification (and is still in force), prohibits the installation or working of wireless telegraphy apparatus in the United Kingdom, on board British ships, without a licence from the Postmaster-General. Its principal objects were, by regulating wireless telegraphy, to make it more useful for purposes of defence and general communication. The memorandum which was laid before the House of Commons in explanation of the Bill stated that the necessity of legislation depended in the first place on the importance from the naval point of view of giving the Government control over wireless stations in time of war or emergency, and, secondly, on the desirability of placing the Government in the position to enter into an agreement on the subject with other countries if it should be found expedient to do so.

In October, 1906, a second International conference was held in Berlin, and its primary objects may be classified under the following headings:—1. The acceptance and transmission of telegrams. 2. The adoption of rules of working. 3. The provision of means of collecting charges and settling accounts between the different countries. 4. Arrangements for the publication of all information necessary for inter-communication. 5. Rules to prevent interference and confusion in working, with adequate provisions for enforcement. 6. Provision that, with certain exceptions, inter-communication must not be refused on account of the differences in the systems of wireless telegraphy employed.

The documents signed at Berlin on November 3rd, 1906, consisted of:—(*a*) The Convention; (*b*) the Additional Undertaking; (*c*) the Final Protocol; (*d*) the Service Regulations. These documents were revised at the London Conference held in 1912, and the Convention, which came into operation on July 1st, 1913, is set out in the following pages.

Towards the end of 1913 there was held in London an International Conference on Safety of Life at Sea. The Convention drawn up and signed on January 20th, 1914, laid down, among other things, the minimum equipment for ships of different grades during the coming three years. For the purposes of defining the hours of service the Radiotelegraphic Convention of 1912 divided ship stations into three classes. It was not, however, in a position to specify in which of these classes ships should be entered according to the nature of the services performed by them. This has since been clearly defined by the provisions of the Inter-

national Conference on Safety of Life at Sea relating to radiotelegraphy.

The central agency established for the purpose of collecting and distributing information in accordance with the requirements of the International Radiotelegraphic Convention is commonly known as the "Berne Bureau." This is merely a branch of the Bureau of the International Telegraph Union, situated at Berne, in Switzerland. It has no initiative or executive power and holds a subordinate position, its functions being practically confined to the collection and circulation of information. Notwithstanding this, the International Bureau at Berne is an organisation of the highest importance, thanks to the zealous, economical and efficient manner in which it is conducted. To this organisation is entrusted the work of preparing and circulating, in accordance with Article 13 of the Convention, particulars regarding each station, such as the name, nationality, geographical position, call signal, normal range, wave length, nature of service performed by the station, hours of service, etc.

The supplementary expenses resulting from the work of the International Bureau in connection with radiotelegraphy must not exceed 80,000 francs per annum, not including special expenses to which the meeting of an International Conference gives rise. For the purposes of contribution towards the expenses the administrations of the contracting States are divided into six classes, as shown in Article 43 of the regulations.

INTERNATIONAL RADIO-TELEGRAPHIC CONVENTION

London, July 5th, 1912

International Radiotelegraphic Convention concluded between Great Britain and various British Colonies and Protectorates, the Union of South Africa, the Commonwealth of Australia, Canada, British India, New Zealand, Greece, Italy and the Italian Colonies, Germany and the German Protectorates, the United States of America and the Possessions of the United States of America, the Argentine Republic, Austria, Hungary, Bosnia-Herzegovina, Belgian Congo, Brazil, Bulgaria, Chili, Denmark, France and Algeria, French West Africa, French Equatorial Africa, Indo-China, Madagascar, Tunis, Japan and Chosen, Formosa, Japanese Saghalen and the Leased Territory of Qantung, Morocco, Monaco, Norway, the Netherlands, the Dutch Indies and the Colony of Curacoa, Persia, Portugal and the Portuguese Colonies, Roumania, Russia and the Russian Possessions and Protectorates, the Republic of San Marino, Siam, Sweden, Turkey and Uruguay.

The undersigned Plenipotentiaries of the Governments of the countries enumerated above, being assembled in Conference in London, have, by mutual consent, and subject to ratification, concluded the following Convention :—

Article 1.

The High Contracting Parties undertake to apply the provisions of the present Convention at all the radiotelegraph stations (coast stations and ship stations) which are established or worked by the Contracting Parties and open for the service of public correspondence between the land and ships at sea.

They undertake, moreover, to impose the observance of these provisions upon private enterprises authorised either to establish or to work radiotelegraphic coast stations open to the service of public correspondence between the land and ships at sea, or to establish or to work radiotelegraphic stations whether open for public correspondence or not on board the ships which carry their flag.

ARTICLE 2.

The term coast station means radiotelegraphic station established on land or on board any ship permanently anchored and used for the exchange of correspondence with ships at sea.

The term ship station means any radiotelegraphic station established on board a ship other than a permanently moored ship.

ARTICLE 3.

Coast stations and ship stations are bound to exchange radiotelegrams reciprocally without regard to the radiotelegraph system adopted by such stations.

Each ship station is bound to exchange radiotelegrams with any other ship station without distinction as to radiotelegraphic system adopted by such stations.

Nevertheless, in order not to impede scientific progress, the provisions of the present Article do not prevent the contingent employment of a radiotelegraphic system incapable of communicating with other systems, provided that such incapacity be due to the specific nature of such system and that it be not caused by devices adopted solely with the object of preventing intercommunication.

ARTICLE 4.

Notwithstanding the provisions of Article 3, a station may be appropriated to a restricted public service determined by the object of the correspondence or by other circumstances independent of the system employed.

ARTICLE 5.

Each of the High Contracting Parties undertakes to cause the coast stations to be connected with the telegraph system by means of special wires, or, at least, to take such other measures as will ensure a rapid exchange between the coast stations and the telegraph system.

ARTICLE 6.

The High Contracting Parties shall mutually notify one another of the names of the coast stations and ship stations covered by Article 1, as well as of all the particulars necessary to facilitate and accelerate the radiotelegraphic exchanges as specified in the Detailed Regulations.

ARTICLE 7.

Each of the High Contracting Parties reserves to itself the right to prescribe or to permit in the stations covered by

Article 1—independently of the installation of which the particulars are published conformable to Article 6—the installation and working of other arrangements designed for special radiotelegraphic transmission without publication of the details of such devices.

ARTICLE 8.

The working of radiotelegraphic stations shall be organised as far as possible in such a manner as not to interfere with the working of other stations of the kind.

ARTICLE 9.

Radiotelegraphic stations shall be obliged to accept with absolute priority calls of distress from whatever source, to reply in like manner to such calls, and to give the effect to them which they require.

ARTICLE 10.

The charge for a radiotelegram shall include, according to the circumstances :—

1. *(a)* The "coast charge" which accrues to the coast station.
   (b) The "ship charge" which accrues to the ship station.
2. The charge for transmission over the lines of the telegraph system, calculated in accordance with the ordinary rules.
3. The transit charges of the intermediate coast or ship stations and the charges appertaining to special services required by the sender.

The rate of the coast charge shall be subject to the approval of the Government to whose authority the coast station is subject, and the rate of the ship charge to the approval of the Government to which the ship belongs.

ARTICLE 11.

The provisions of the present Convention are completed by Detailed Regulations which have the same validity and come into force at the same time as the Convention.

The provisions of the present Convention and of the Regulations relating thereto may be modified at any time by mutual consent of the High Contracting Parties. Conferences of Plenipotentiaries having power to modify the Convention and the Regulations shall take place periodically; each Conference shall itself fix the place and time of the succeeding Conference.

ARTICLE 12.

These Conferences shall be composed of Delegates of the Governments of the Contracting Parties.

In the deliberations each country shall have one vote only.

If a Government adhere to the Convention for its colonies, possessions or protectorates, subsequent Conferences may determine that the whole or part of such colonies, possessions or protectorates is to be regarded as forming a country for the purposes of the foregoing clauses. But the number of votes to be exercised by a Government, including its colonies, possessions or protectorates, may not exceed six.

The following are regarded as forming a single country for the purposes of the present Article :—

The Union of South Africa.
The Australian Commonwealth.
Canada.
British India.
New Zealand.
German East Africa.
German South-West Africa.
The Cameroons.
Togoland.
The German Pacific Protectorates.
Alaska.
Hawaii and the other American possessions in Polynesia.
The Philippine Islands.
Porto Rico and the American possessions in the Antilles.
The zone of the Panama Canal.
The Belgian Congo.
The Spanish Colony of the Gulf of Guinea.
French West Africa.
French Equatorial Africa.
Indo-China.
Madagascar.
Tunisia.
Erythrea.
Italian Somaliland.
Chosen, Formosa, Japanese Saghalen and the leased territory of Qantung.
The Dutch Indies.
The Colony of Curaçao.
Portuguese West Africa.

Portuguese East Africa and the Portuguese possessions in Asia.
Russian Central Asia (littoral of the Caspian Sea).
Bokhara.
Khiva.
Western Siberia (littoral of the Arctic Ocean).
Eastern Siberia (littoral of the Pacific Ocean).

Article 13.

The International Bureau of the Telegraph Union shall be entrusted with the duty of collecting, co-ordinating, and publishing information of every kind relating to radiotelegraphy; of circulating in proper form proposals for the modification of the Convention, and of the Regulations; of notifying the changes adopted, and, generally, of carrying out any Administrative work which it may be called upon to undertake in the interests of International Radiotelegraphy.

The expenses of this institution shall be borne by all the Contracting Parties.

Article 14.

Each of the High Contracting Parties reserves to itself the right to fix the conditions under which it will admit radiotelegrams coming from or destined for a station, whether a ship station or a coast station, which is not subject to the provisions of the present Convention.

If a radiotelegram is admitted, the ordinary charges must be applied to it.

Every radiotelegram originating at a ship station and received by a coast station of the contracting country, or accepted in transit by the Administration of a contracting country, shall be sent forward.

Every radiotelegram intended for a ship shall also be sent forward if the Administration of the contracting country has accepted it from the sender, or if the Administration of a contracting country has accepted it in transit from a non-contracting country, subject to the right of the coast station to refuse transmission to a ship station belonging to a non-contracting country.

Article 15.

The provisions of the Articles 8 and 9 of this Convention are equally applicable to radiotelegraphic installations other than those indicated in Article 1.

ARTICLE 16.

Governments which have not taken part in the present Convention shall be allowed to become party to it at their own request.

Such adherence shall be notified through diplomatic channels to that one of the contracting Governments in whose territory the last Conference was held, and by that Government to the others.

Such adherence shall involve complete acceptance of all the clauses of the present Convention and admission to all the advantages stipulated therein.

The adherence to the Convention of the Government of a country having colonies, possessions, or protectorates shall not carry with it the adherence of the colonies, possessions, or protectorates of such Government, unless a declaration be made to that effect by such Government. These colonies, possessions, or protectorates as a whole, or each one of them separately, may form the subject of a separate adherence or of a separate denunciation under the conditions indicated in the present Article and in Article 22.

ARTICLE 17.

The provisions of Articles 1, 2, 3, 5, 6, 7, 8, 11, 12, and 17, of the International Telegraph Convention of St. Petersburg dated 10/22 July 1875 shall be applicable to International Radiotelegraphy.

ARTICLE 18.

In cases of difference of opinion between two or more contracting Governments concerning the interpretation or the execution either of the present Convention or of the Regulations provided for by Article 11, the question at issue may, by mutual consent, be submitted to arbitration. In that event each of the Governments concerned shall choose another not interested in the question.

The decision of the Arbitrators shall be made by an absolute majority of votes.

In the event of an equality of votes, the Arbitrators shall appoint, in order to settle the difficulty, another Contracting Government not concerned in the question in dispute. In default of an agreement with regard to such choice, each Arbitrator shall propose a Contracting Government not interested in the dispute; and lots shall be drawn as between the Governments proposed.

The drawing of lots shall be the prerogative of the Government in whose territory the International Bureau provided for in Article 13 performs its work.

ARTICLE 19.

The High Contracting Parties undertake to adopt or to propose to their respective legislatures the measures necessary to ensure the execution of the present Convention.

ARTICLE 20.

The High Contracting Powers shall communicate to one another such laws as may have been already enacted or which may be about to be so enacted in their countries, relating to the subject of the present Convention.

ARTICLE 21.

The High Contracting Parties maintain their entire liberty concerning the radiotelegraphic installations not covered by Article 1, and particularly with regard to naval and military installations, and also to stations carrying out communications between fixed points. All such installations and stations shall remain subject solely to the obligations provided for in Articles 8 and 9 of the present Convention.

Nevertheless when these installations and stations carry out an exchange of maritime public correspondence, they shall conform, in carrying out such service, to the requirements of the Regulations so far as concerns the method of transmission and accounting.

If, on the other hand, coast stations carry out, at the same time as public correspondence with ships at sea, communications between fixed points, they shall not be subject, in the execution of this latter service, to the provisions of the Convention, except as to the observance of Articles 8 and 9 of this Convention.

However, fixed stations which carry out correspondence between land and land must not refuse the exchange of radiotelegrams with another fixed station on account of the system adopted by such station; nevertheless, the liberty of each country shall remain complete in respect of the organisation of the service for correspondence between fixed points and the decision as to the correspondence to be carried out by the stations appropriated to such service.

ARTICLE 22.

The present Convention shall come into execution on and from the 1st of July 1913, and shall remain in force for an inde-

terminable period and until the expiry of one year from the day upon which it is denounced.

Denunciation shall only take effect as regards the Government in whose name it is made. So far as the other Contracting Parties are concerned, the Convention shall remain in force.

ARTICLE 23.

The present Convention shall be ratified, and the ratification thereof shall be deposited in London with as little delay as possible.

If one or more of the High Contracting Parties shall not ratify the Convention, it shall not be less valid thereby for the Parties which have ratified it.

In witness whereof the respective Plenipotentiaries have signed the Convention in a single copy, which shall remain deposited in the archives of the British Government, and of which a copy shall be sent to each Party.

London, the 5th of July, 1912.

FINAL PROTOCOL.

At the time of proceeding to the signature of the Convention adopted by the International Radiotelegraphic Conference of London, the undersigned Plenipotentiaries have agreed as follows:—

I.

The exact nature of the adherence notified on the part of Bosnia-Herzegovina not being yet determined, it is recognised that Bosnia-Herzegovina is entitled to a vote, a decision at a later date being necessary on the question whether this vote belongs to Bosnia-Herzegovina in virtue of the second paragraph of Article 12 of the Convention, or whether this vote is accorded to it conformably to the provisions of the third paragraph of that Article.

II.

The following declaration is placed on record:—

The Delegation of the United States declares that its Government is under the necessity of abstaining from all action with regard to tariffs, because the transmission of radiotelegrams as well as of telegrams in the United States is undertaken, wholly or in part, by commercial or private companies.

III.

The following declaration was also placed on record:—

The Government of Canada reserves to itself the right to fix

separately, for each of its coast stations, a total sea charge for radiotelegrams originating from North America and intended for any ship whatever, the coast charge amounting to three-fifths and the ship charge to two-fifths of such total charge.

In witness whereof the respective Plenipotentiaries have drawn up the present Final Protocol, which shall have the same force and the same validity as if the provisions thereof had been inserted in the text itself of the Convention to which it belongs, and they have signed it in a single copy which shall remain deposited in the archives of the British Government, and of which a copy shall be sent to each party.

London, the 5th of July, 1912.

SERVICE REGULATIONS ANNEXED TO THE INTERNATIONAL RADIOTELEGRAPHIC CONVENTION.

CONTENTS.

I.—ORGANISATION OF RADIOTELEGRAPHIC STATIONS.

I.

The choice of radiotelegraphic apparatus and devices to be used by coast stations and ship stations is free. The installation

of these stations must, as far as possible, be in keeping with scientific and technical progress.

II.

Two wave-lengths, one of 600 and the other of 300 metres, shall be admitted for the service of general public correspondence. Every coast station open to this service must be equipped in such a way as to be able to use these two wave-lengths, of which one shall be designated as the normal wave-length of the station. During the whole time that it is open every coast station must be in a position to receive calls made by means of its normal wave-length. Nevertheless, for the correspondence covered by paragraph 2 of Regulation XXXV., use shall be made of a wave-length of 1,800 metres. Further, each Government may authorise the use, in a coast station, of other wave-lengths for the purpose of securing a long-range service or a service other than that of general public correspondence, and established in conformity with the provisions of the Convention, with the reservation that these wave-lengths do not exceed 600 metres, or that they do exceed 1,600 metres.

In particular, stations used exclusively for the despatch of signals intended to determine the position of ships must not use wave-lengths exceeding 150 metres.

III.

1. Every ship station must be equipped in such a way as to be able to use the wave-lengths of 600 metres and of 300 metres. The first shall be the normal wave-length, and may not be exceeded in transmission, the case of Regulation XXXV. (paragraph 2) excepted.

Use may be made of other wave-lengths not exceeding 600 metres in special cases, and subject to the approval of the Administrations to which the coast stations and ship stations concerned are subject.

2. During the whole time that it is open every ship station must be able to receive calls made by means of its normal wave-length.

3. Ships of small tonnage, in the case of which it would be materially impossible to use the wave-length of 600 metres for transmission, may be authorised to employ exclusively the wave-length of 300 metres; they must be able to receive by means of the wave-length of 600 metres.

IV.

Communications between a coast station and a ship station, or between two ship stations, must be exchanged on both sides by means of the same wave-length. If, in a particular case, communication is difficult, the two stations may, by mutual consent, pass from the wave-length by means of which they are communicating to the other regulation wave-length.. Both stations shall resume their normal wave-lengths when the radiotelegraphic exchange is finished.

V.

1. The International Bureau shall prepare, publish and revise periodically an official map showing the coast stations, their normal ranges, the principal lines of navigation, and the time normally taken by ships for the voyage between the various ports of call.

2. It shall draw up and publish a Nomenclature of the radiotelegraphic stations covered by Article I. of the Convention, and also periodical supplements for additions and modifications. This Nomenclature shall give, in the case of each station, the following information :—

1st.—For coast stations : the name, nationality, and geographical position indicated by the territorial sub-division and by the longitude and latitude of the place; for ship stations : the name and nationality of the ships; when the case arises, the name and address of the contractor.

2nd.—The call signal. (The call signals must be differentiated from one another, and each one must consist of a group of three letters.)

3rd.—The normal range.

4th.—The radiotelegraphic system with the characteristics of the system of discharge (musical sparks, tone expressed by the number of double vibrations, etc.).

5th.—The wave-lengths used (the normal wave-length to be underlined).

6th.—The nature of the services performed.

7th.—The hours of working.

8th.—When necessary the hour and method of despatch of time signals and meteorological telegrams.

9th.—The coast or ship charge.

3. There shall also be included in the Nomenclature such information relating to radiotelegraphic stations other than those

M. Louis J. Malvy

Minister of Commerce, Industry, Posts and Telegraphs, France.

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covered by Article 1 of the Convention, as shall be communicated to the International Bureau by the Administrations to which such stations are subject, provided that these are either Administrations which are parties to the Convention, or, if they are not parties to it, have made the declaration provided for in Regulation XLVIII.

4. The following notations shall be adopted in documents for the use of the international service to designate radiotelegraph stations :—

PG—station open for general public correspondence.
PR—station open for restricted public correspondence.
P—private station.
O—station open only for official correspondence.
N—station always open.
X—station not having fixed working hours.

5. The name of a ship station indicated in the first column of the Nomenclature must be followed, when there is duplication of the name, by the call-signal of such station.

VI.

The exchange of unnecessary signals and words is forbidden to the stations covered by Article 1 of the Convention. Experiments and practice shall not be allowed in these stations, except so far as they do not disturb the service of other stations.

Practice must be carried out with wave-lengths different from those allowed for public correspondence, and with the minimum of power necessary.

VII.

1. All stations are bound to exchange traffic with the minimum of energy necessary to ensure good communication.

2. Every coast and ship station must comply with the following conditions :—

(*a*) The waves emitted must be as pure and as little damped as possible.

In particular, the use of transmitting devices in which the production of the waves emitted is obtained by discharging the aerial direct by sparks (plain aerial) shall not be allowed except in cases of distress.

It may, however, be allowed in the case of certain special stations (for example those of small ships) in which the primary power does not exceed 50 watts.

(*b*) The apparatus must be capable of transmitting and

receiving at a speed at least equal to 20 words per minute, the word being reckoned at the rate of five letters.

New installations bringing into play an energy of more than 50 watts shall be equipped in such a way that it may be possible to obtain easily several ranges less than the normal range, the shortest being of approximately 15 nautical miles. Installations already established bringing into play an energy of more than 50 watts shall be transformed as far as possible in such a manner as to satisfy the foregoing requirements.

(*c*) Receiving apparatus must allow of receiving, with the greatest possible amount of protection from disturbance, transmissions made with the wave-lengths specified in present Regulations, up to 600 metres.

3. Stations serving solely for determining the position of ships (*radiophares*) must not operate over an area of greater radius than 30 nautical miles.

VIII.

Independently of the general conditions specified in Regulation VII., ship stations must also satisfy the following conditions :—

(*a*) The power transmitted to the radiotelegraphic apparatus, measured at the terminals of the generator of the station, must not under normal circumstances exceed one kilowatt.

(*b*) Subject to the provisions of Regulation XXXV., par. 2, a power exceeding one kilowatt may be used, if the ship is under the necessity of corresponding at a distance of more than 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, communication cannot be realised except by means of an increase of power.

IX.

1. No ship station may be established or worked by private enterprise without a licence issued by the Government to which the ship is subject.

Stations on board ship having their port of register in a colony, possession, or protectorate may be described as being subject to the authority of such colony, possession, or protectorate.

2. Every ship station holding a licence issued by one of the contracting Governments must be regarded by the other Governments as having an installation fulfilling the conditions imposed by the present Regulations.

The competent authorities of the countries where the ship calls may demand the production of the licence. In default of such production, these authorities may ascertain whether the radiotelegraph installations of the ship satisfy the conditions imposed by the present Regulations.

When an Administration has practical evidence that a ship station is not fulfilling these conditions, it must, in every case, address a complaint to the Administration of the country to which the ship is subject. From that point onwards the procedure shall be, when necessary, as provided in Regulation XII., paragraph 2.

X.

1. The service of the ship station must be carried out by a telegraphist holding a certificate issued by the Government to which the ship is subject, or, in an emergency and for one voyage only, by another Government party to the convention.

2. There shall be two classes of certificates:

The first-class certificate shall state the professional qualifications of the operator with regard to:—

(*a*) the adjustment of the apparatus and knowledge of their working;

(*b*) transmitting and receiving by ear, at a speed which must not be less than 20 words per minute.

(*c*) knowledge of the regulations applying to the exchange of radiotelegraphic communications.

The second-class certificate may be issued to a telegraphist who only attains to a speed in transmitting and receiving of 12 to 19 words per minute, but who fulfils the other conditions mentioned above. Telegraphists holding a second-class certificate may be allowed:—

(*a*) on ships only using radiotelegraphy for their own service and for the correspondence of the ship's company, in particular on fishing vessels;

(*b*) on all ships as substitutes, provided that such ships have on board at least one operator holding a first-class certificate. Nevertheless, on ships placed in the first class indicated in Reg. XIII., the service must be carried

out by at least two telegraphists holding first-class certificates.

In ship stations, transmissions may only be made by a telegraphist holding a first or second-class certificate, an exception being made of cases of emergency, in which it would be impossible to conform to this provision.

3. Further, the certificate shall testify that the Government has placed the telegraphist under the obligation of preserving the secrecy of correspondence.

4. The radiotelegraph service of the ship station shall be placed under the supreme authority of the captain of the ship.

XI.

Ships provided with radiotelegraph installations and placed in the first two classes indicated in Reg. XIII. shall be bound to have emergency radiotelegraph installations of which all the parts shall be placed in conditions of the greatest safety possible, such conditions to be determined by the Government which issues the licence. These emergency installations must have at command a source of power of their own, must be capable of being set working speedily, must be able to work for six hours at least, and must have a minimum range of 80 nautical miles in the case of ships in the first class, and of 50 miles in the case of those of the second class. This emergency installation shall not be required in the case of ships whose ordinary installation fulfils the conditions of the present article.

XII.

1. If an Administration has information of a breach of the Convention or of the Regulations committed in one of the stations which it has authorised, it shall ascertain the facts and fix the responsibility.

In the case of ship stations, if the responsibility rests on the operator, the Administration shall take the necessary steps, and, if necessary, shall withdraw the certificate. If it is shown that the breach was due to the condition of the apparatus or to instructions given to the telegraphist, the same procedure shall be followed in respect of the licence issued to the ship.

2. In the event of repeated breaches by the same ship, if the representations made to the Administration to which the ship is subject, by another Administration, remain without effect, the latter shall have the right, after notice given, of authorising its coast stations not to accept communications coming from the ship

in question. In case of a difference between the two Administrations, the question shall be submitted to Arbitration on the request of one of the Governments concerned. The procedure is indicated in Article XVIII. of the Convention.

II.—HOURS OF SERVICE OF STATIONS.

XIII.

(a) *Coast Stations.*

1. The service of coast stations shall be, as far as possible, permanent, day and night, without interruptions.

Nevertheless certain coast stations may have a service of limited duration. Each Administration shall fix the hours of service.

2. Coast stations whose service is not permanent may not close before having transmitted all their radiotelegrams to the ships which are in their radius of action nor before having received from such ships all the radiotelegrams of which notice has been given. This provision shall also apply when ships notify their presence before work has actually ceased.

(b) *Ship Stations.*

3. Ship stations shall be placed in three classes:—

1st, stations always open;

2nd, stations having limited working hours;

3rd, stations having no fixed working hours.

During navigation, the following must remain permanently on the watch: 1st, ships of the first class; 2nd, those of the second class, during the hours that they are open for service; out of these hours, the latter stations must remain on the watch for the first 10 minutes of each hour. The stations of the third class are not bound to perform any regular "listening" service.

It shall fall to the Governments which issue the licences specified in Article IX. to fix the class in which the ship is to be placed, in respect of its obligations in the matter of keeping watch. This classification shall be mentioned in the licence.

III.—DRAWING UP AND HANDING IN OF RADIO-TELEGRAMS.

XIV.

1. Radiotelegrams shall bear, as the first word of the preamble, the service instructions "radio."

2. In the transmission of radiotelegrams coming from a ship

at sea, the date and the hour of the handing in at the ship station shall be indicated in the preamble.

3. On forwarding over the telegraph system, the coast station shall insert, as the indication of the office of origin, the name of the ship of origin as it appears in the Nomenclature, and also, when the case arises, that of the last ship which served as an intermediary. These particulars shall be followed by the name of the coast station.

XV.

1. The address of radiotelegrams intended for ships must be as complete as possible. It shall be compulsorily drawn up as follows:—

(*a*) Name or title of the addressee, with supplementary particulars if necessary.

(*b*) Name of the ship, as it appears in the first column of the Nomenclature.

(*c*) Name of the coast station, as it appears in the Nomenclature.

Nevertheless the name of the ship may be replaced, at the risks and perils of the sender, by the particulars of the voyage taken by such ship and determined by the names of the ports of origin and destination or by any other equivalent particulars.

2. In the address, the name of the ship, as it appears in the first column of the Nomenclature, shall be counted in every case, and independently of its length, as one word.

3. Radiotelegrams drawn up by means of the International Signal Code shall be forwarded to their destination without being de-coded.

IV.—CHARGES.

XVI.

1. The coast charge and the ship charge shall be fixed in accordance with the tariff per word pure and simple, on the basis of a fair remuneration for radiotelegraphic work, with optional application of a minimum charge per radiotelegram.

The coast charge may not exceed 60 centimes per word, nor the ship charge 40 centimes per word. Nevertheless each Administration shall have the right to authorise coast and ship charges higher than these maxima in the case of stations having a range of more than 400 nautical miles, or if stations exceptionally onerous on account of the material conditions of their installation or working.

The optional minimum charge per radiotelegram may not exceed the coast or ship charge for a radiotelegram of 10 words.

2. In the case of radiotelegrams originating from or intended for a country or exchanged directly with the coast stations of that country, the charge applying to the transmission over the lines of the telegraph system must not exceed, on the average, that of the inland rate of that country.

This charge shall be reckoned per word pure and simple, with an optional minimum charge not exceeding the charge for 10 words. It shall be notified in francs by the Administration of the country to which the coast station is subject.

In the cases of countries in the European system, with the exception of Russia and Turkey, there shall only be a single charge for the territory of each country.

XVII.

1. When a radiotelegram originating from a ship and intended for *terra firma* passes through one or two ship stations, the charge shall include, in addition to those of the ship of origin, the coast station, and the telegraph system, the ship charge of each of the ships taking part in the transmission.

2. The sender of a radiotelegram originating from *terra firma* and intended for a ship may require that his message be transmitted by way of one or two ship stations; he shall deposit for this purpose the amount of the radiotelegraphic and telegraphic charges, and besides, as a deposit, a sum to be fixed by the office of origin with a view to the payment to the intermediate ship stations of the transit charges fixed in paragraph 1; he must further pay, as he may choose, either the charge for a telegram of five words or the cost of postage of a letter to be sent by the coast station to the office of origin giving the information necessary to the liquidation of the sum deposited.

The radiotelegram shall then be accepted at the risks and perils of the sender; it shall bear before the address the paid additional particulars "x retransmissions telegraphe" or "x retransmissions lettre" (x representing the number of retransmissions required by the sender) accordingly as the sender desires that the information necessary for the liquidation of the deposit be furnished by telegram or by letter.

3. The charge for radiotelegrams originating from a ship, intended for another ship, and sent by way of one or two intermediate coast stations, shall include :—

The ship charges of both ships, the charge of the coast

station or the two coast stations, as the case may be, and when necessary the telegraph charge appropriate to the transit between the two coast stations.

4. The charge for radiotelegrams exchanged between ships without the aid of a coast station includes the ship charges of the ship of origin and of the ship of destination, with the ship charges of the intermediate stations added thereto.

5. The coast and ship charges due to the stations of transit shall be the same as those fixed for such stations when these are stations of origin and destination. In no case shall they be collected more than once.

6. In the case of any intermediate coast station, the charge to be collected for the transit service shall be the highest of the coast charges appertaining to the direct exchange with the two ships in question.

XVIII.

The country in whose territory is established a coast station acting as intermediary for the exchange of radiotelegrams between a ship station and another country shall be regarded, for the purpose of applying telegraphic charges, as the country of origin or of destination of such radiotelegrams and not as the country of transit.

V.—COLLECTION OF CHARGES.

XIX.

1. The total charge for radiotelegrams shall be collected from the sender, with the exception—1st, of the cost of express delivery (Article LVIII., paragraph 1, of the Telegraph Regulations); 2nd, of the charges applying to inadmissible joinings or alterations of words noted by the office or station of destination (Article XIX., paragraph 9, of the Telegraph Regulations), these charges being collected from the addressee.

Ship stations must possess the necessary tariffs for this purpose. They shall have, however, the right to obtain information from coast stations with regard to charges for radiotelegrams for which they do not possess all the necessary information.

2. The counting of words by the office of origin shall be decisive in the case of radiotelegrams addressed to ships, and that of the ship station of origin shall be decisive in the case of radiotelegrams originating in ships, both for the purpose of transmission and for that of the international accounts. Nevertheless when the radiotelegram is worded wholly or in part either

in one of the languages of the country of destination, in the case of radiotelegrams originating in ships, or in one of the languages of the country to which the ship belongs, in the case of radiotelegrams addressed to ships, and when the radiotelegram contains joinings or alterations of words contrary to the common use of that language, the office or ship station of destination, as the case may be, shall have the right to recover from the addressee the amount of the charge not collected. In the case of a refusal to pay the radiotelegram may be withheld.

VI.—TRANSMISSION OF RADIOTELEGRAMS.

(a) *Signals of Transmission.*

XX.

The signals employed shall be those of the International Morse Code.

XXI.

Ships in distress shall make use of the following signal,

. . . — — — . . .

repeated at short intervals, followed by the necessary particulars.

As soon as a station hears the signal of distress, it must suspend all correspondence and must not resume the same until after it has made sure that the communication consequent upon the call for help is finished.

The stations which hear a call of distress must act according to indications given by the ship which makes the call, with regard to the order of messages or their cessation.

When, at the end of a series of distress calls, there is added the call signal of the particular station, the reply to the call is proper to that station only, unless that station does not reply. Failing the indication of a particular station in the call for help, every station that hears the call shall be bound to reply thereto.

XXII.

For the purpose of giving or asking information concerning the radiotelegraph service, stations must make use of the signals contained in the list appended to the present Regulations. (See p. 72.)

(b) *Order of Transmission.*

XXIII.

Between two stations, radiotelegrams of the same class shall be transmitted singly in alternate order or by series of several radiotelegrams, according to the instructions given by the coast

station, on condition that the duration of the transmission of each series do not exceed 15 minutes.

(c) *Calling of Stations and Transmission of Radiotelegrams.*

XXIV.

1. As a general rule, it shall be the ship station that calls the coast station, whether it has radiotelegrams to transmit or not.

2. In waters where the radiotelegraphic traffic is congested (the Channel, etc.), the call of a ship to a coast station may not, as a general rule, be made unless the latter is within the normal range of the ship station and the ship station has approached to a distance less than 75 per cent. of the normal range of the coast station.

3. Before proceeding to make a call, the coast station or the ship station must adjust its receiving system to the highest possible degree of sensitiveness, and must make sure that no other communication is being made within its radius of action; if it is otherwise, it shall await the first break, unless it finds that its call is not likely to disturb the communication in progress. The same applies when the station wishes to answer a call.

4. For making a call, every station shall use the normal wave of the station to be called.

5. If, in spite of these precautions, a radiotelegraphic transmission be impeded, the call must cease on the first request made by a coast station open to public correspondence. This station must then indicate the approximate duration of the wait.

6. The ship station must make known to each coast station to which it has notified its presence the time at which it proposes to cease its operations, and also the probable duration of the interruption.

XXV.

1. The call comprises the signal — . — . —, the call signal of the station called, sent three times, and the word "de," followed by the call signal of the sending station, sent three times.

2. The station called shall reply by giving the signal — . — . —, followed by the call signal, sent three times, of the calling station, by the word "de" its own call signal and the signal — . —

3. Stations which wish to enter into communication with ships, without, however, knowing the names of those ships which are within their radius of action, may use the signal

— . — . — — . — (signal of enquiry). The provisions of paragraphs 1 and 2 are also applicable to the transmission of the signal of enquiry and to the reply to that signal.

XXVI.

If a station when called does not reply when the call (Regulation XXV.) has been sent three times at intervals of 2 minutes, the call may not be resumed until after an interval of 15 minutes, the station making the call first making sure of the fact that no radiotelegraphic communication is in progress.

XXVII.

Every station which has to make a transmission necessitating the use of high power shall first send out three times the warning signal — — . . — —, with the minimum of power necessary to reach the neighbouring stations. It shall not then begin to transmit with the high power until 30 seconds after sending the warning signal.

XXVIII.

1. As soon as the coast station has replied, the ship station shall furnish it with the following information if it has messages to transmit to it; this information shall also be given when the coast stations ask for it:—

(*a*) The approximate distance, in nautical miles, of the vessel from the coast station;

(*b*) The position of the ship given in a concise form and adapted to the circumstances of the individual case;

(*c*) The next port at which the ship will touch;

(*d*) The number of radiotelegrams if they are of normal length or the number of words if the messages are of exceptional length.

The speed of the ship in nautical miles shall be given specially at the express request of the coast station.

2. The coast station shall reply giving, as provided in paragraph 1, either the number of telegrams or the number of words to be transmitted to the ship and also the order of transmission.

3. If transmission cannot take place immediately the coast station shall inform the ship station of the approximate length of the wait.

4. If a ship station when called cannot receive for the moment it shall inform the calling station of the approximate length of the wait.

5. In the case of exchanges between two ship stations it shall rest with the station called to fix the order of transmission.

XXIX.

When a coast station is called by several ship stations, it shall decide the order in which these stations shall be allowed to exchange their messages.

In the regulation of this order, the coast station shall be guided solely by the necessity for allowing every station concerned to exchange the greatest possible number of radiotelegrams.

XXX.

Before beginning to exchange correspondence, the coast station shall inform the ship station whether the transmission is to be made in alternate order by series (Regulation XXIII.); it shall then begin to transmit, or shall follow up these instructions by the signal — . —

XXXI.

The transmission of a radiotelegram shall be preceded by the signal — . — . — and ended by the signal . — . — . followed by the call signal of the sending station and by the signal — . —

In the case of a series of radiotelegrams, the call-letter of the sending station and the signal — . — shall only be given at the end of the series.

XXXII.

When the radiotelegram to be transmitted contains more than 40 words, the sending station shall interrupt the transmission by the signal . . — — . . after each series of 20 words or thereabouts, and it shall not resume transmission until after having obtained from the station in correspondence the repetition of the last word clearly received, followed by the said signal, or, if the reception is clear, the signal — . —

In the case of transmission in series, the acknowledgment of receipt shall be given after each radiotelegram.

Coast stations engaged in transmitting long radiotelegrams must suspend transmission at the end of each period of 15 minutes, and must remain silent during a period of 3 minutes before continuing transmission.

Coast and ship stations which work in the conditions laid down in Regulation XXXV., paragraph 2, must suspend work at the end of each period of 15 minutes, and keep watch on the wave-length

of 600 metres during a period of 3 minutes before continuing transmission.

XXXIII.

1. When the signals become doubtful, all possible resources must be drawn upon to accomplish transmission. To this end, the radiotelegram shall be transmitted three times at most, at the request of the receiving station. If in spite of this triple transmission the signals are still unintelligible, the radiotelegram shall be cancelled.

If the acknowledgment of receipt does not come to hand, the sending station shall again call the station with which it is in correspondence. When no reply is made after three calls, the transmission shall not be persevered with. In such case, the sending station shall have the right to obtain the acknowledgment of receipt through the medium of another radiotelegraph station, using, when necessary, the lines of the telegraph system.

2. If the receiving station considers that, in spite of defective receiving, the radiotelegram can be delivered, it shall insert at the end of the preamble the service advice "Reception douteuse" and shall forward the radiotelegram. In such case, the Administration to which the coast station is subject shall claim the charges, in conformity with Clause XLII. of the present Regulations. Nevertheless, if the ship station later on transmits the radiotelegram to another coast station of the same Administration, the latter can only claim the charges appertaining to a single transmission.

(d) *Acknowledgment of Receipt and End of Work.*

XXXIV.

1. The acknowledgment of receipt shall be given in the form prescribed by the International Telegraph Regulations; it shall be preceded by the call signal of the sending station and followed by the call signal of the receiving station.

2. The end of the work between two stations shall be indicated by each one of them by means of the signal . . . — . — followed by its own call signal.

(e) *Route to be taken by Radiotelegrams.*

XXXV.

1. As a general principle, the ship station shall transmit its radiotelegrams to the nearest coast station.

However, if the ship station has the choice between several coast stations at equal or nearly equal distances, it shall give

the preference to that which is established on the territory of the country of destination or of normal transit of its radiotelegrams.

2. Nevertheless, a sender on board a ship shall have the right to indicate the coast station by which he wishes his radiotelegram to be forwarded. The ship station shall then wait until this coast station is the nearest.

Exceptionally, transmission may be made to a more distant coast station, provided :—

(*a*) that the radiotelegram is intended for the country in which such coast station is situated and that it comes from a ship subject to that country;

(*b*) that for calls and transmission both stations use a wave length of 1,800 metres;

(*c*) that transmission by this wave-length does not disturb any transmission made, by means of the same wave-length, by a nearer coast station;

(*d*) that the ship station is more than 50 nautical miles distant from any coast station shown in the Nomenclature. The distance of 50 miles may be reduced to 25 miles, subject to the reservation that the maximum power at the terminals of the generator do not exceed 5 kilowatts and that the ship stations be established in conformity with Regulations VII. and VIII. This reduction of distance shall not apply in the seas, bays or gulfs of which the shores belong to one country only and of which the opening to the high sea is less than 100 miles wide.

VII.—DELIVERY OF RADIOTELEGRAMS.

XXXVI.

When for any cause whatsoever a radiotelegram coming from a ship at sea and intended for *terra firma* cannot be delivered to the addressee an advice of non-delivery shall be sent out. This advice shall be transmitted to the coast station which received the original radiotelegram. The latter, after verifying the address, shall forward the advice to the ship, if possible, and, if need be, by way of another coast station of the same country or of a neighbouring country.

When a radiotelegram, having arrived at the ship station, cannot be delivered, that station shall inform the office or ship station of origin by means of a service advice. In the case of radiotelegrams coming from *terra firma* this advice shall be trans-

mitted, whenever possible, to the coast station by way of which the radiotelegram passed, or, if necessary, to another coast station of the same country or of a neighbouring country.

XXXVII.

If the ship to which the radiotelegram is addressed has not notified its presence to the coast station within the time specified by the sender, or, in the absence of such specification, up to the morning of the eighth day following, such coast station shall give notice of the fact to the office of origin, which shall inform the sender of the same.

This latter shall have the option of requiring by paid service advice, telegraphic or postal, addressed to the coast station, that his radiotelegram be kept for a fresh period of nine days, for transmission to the ship, and so on. In the absence of such request the radiotelegram shall be returned as undelivered at the end of the ninth day (the day of handing in not to be included).

However, if the coast station is sure that the ship has left its radius of action before the station could have transmitted the radiotelegram to it, such station shall immediately inform the office of origin, which shall without delay advise the sender of the cancellation of the message. Nevertheless, the sender may, by paid service advice, request the coast station to transmit the radiotelegram when the ship next passes.

VIII.—SPECIAL RADIOTELEGRAMS.

XXXVIII.

The following only shall be allowed :—

1st, *Reply Paid Radiotelegrams.*—These radiotelegrams shall bear, before the address, the indication, "Réponse payée," or "RP," completed by the mention of the amount paid in advance for the reply—for example : "Réponse payée fr. x," or "RP, fr. x."

The reply voucher issued on board a ship shall give the right to send, up to the limit of its value, a radiotelegram to any address whatever from the ship station which issues such voucher.

2nd, *Collated Radiotelegrams.*

3rd, *Express Delivery Radiotelegrams.*—But only in cases in which the amount of the cost of express delivery is collected from the addressee. The countries which cannot adopt these radiotelegrams must notify the fact to the International Bureau. Radiotelegrams for express delivery, with collection of the cost from the sender, may be allowed when they are intended for the

country in whose territory the corresponding coast station is situated.

4th, *Radiotelegrams for Delivery by Post.*

5th, *Multiple Radiotelegrams.*

6th, *Radiotelegrams with Acknowledgment of Receipt.*—But only with regard to notification of the date and time at which the coast station has transmitted to the ship station the telegram addressed to the latter.

7th, *Paid Service Advices.*—Except those asking for repetition of information. Nevertheless, all paid service advices shall be allowed on the route over the telegraph lines.

8th, *Urgent Radiotelegrams.*—But only in transmission over the telegraph lines, and subject to the application of the International Telegraph Regulations.

XXXIX.

Radiotelegrams may be transmitted by a coast station to a ship, or by a ship to another ship, with the object of being forwarded by post, the posting to take place from a port of call of the receiving ship.

The address of these radiotelegrams must be drawn up as follows :—

1st, Paid instruction "poste," followed by the name of the port where the radiotelegram is to be posted;

2nd, Full name and address of the addressee;

3rd, Name of the ship station which is to carry out the posting;

4th, When necessary, name of the coast station.

Example: Poste Buenos Aires, Martinez, 14 Calle Prat, Valparaiso, Avon Lizard.

The charge shall include, as well as the radiotelegraph and telegraph charges, a sum of 25 centimes for the postage of the radiotelegram.

IX.—ARCHIVES.

XL.

The originals of radiotelegrams, as well as the documents relating thereto, retained by the Administrations, shall be kept with all necessary precautions in respect of secrecy for at least fifteen months, counting from the month following that in which the radiotelegrams were handed in.

These originals and documents shall be sent, as far as

possible, at least once a month by the ship stations to the Administrations to which they are subject.

X.—REFUNDS AND REIMBURSEMENTS.

XLI.

With regard to refunds and reimbursements, the provisions of the International Telegraph Regulations shall apply, bearing in mind the restrictions laid down in Clauses XXXVIII. and XXXIX. of the present Regulations and subject to the following reservations:—

The time occupied in radiotelegraphic transmission, and also the time during which the radiotelegram remains at the coast station in the case of radiotelegrams addressed to ships, or in the ship station in the case of radiotelegrams originating in ships, shall not be counted in the period of delay giving rise to refunds and reimbursements.

If the coast station informs the office of origin that a radiotelegram cannot be transmitted to the ship to which it is addressed, the Administration of the country of origin shall immediately initiate the reimbursement to the sender of the coast and ship charges in respect of such radiotelegram. In this case, the charges reimbursed shall not appear in the account for which provision is made by Regulation XLII., but the radiotelegram shall be mentioned therein as a memorandum.

Reimbursements shall be borne by the various Administrations and private enterprises which have taken part in the forwarding of the radiotelegram, each one of them relinquishing its share of the charge. Nevertheless, radiotelegrams falling under the provision of Articles VII. and VIII. of the Convention of St. Petersburg shall remain subject to the provisions of the International Telegraph Regulations, except when it is due to an error of service that such radiotelegrams have been accepted.

When the acknowledgment of receipt of a radiotelegram has not reached the station which transmitted the message, the charge shall not be refunded until it has been proved that the radiotelegram is one which gives occasion for reimbursement.

XI.—ACCOUNTING.

XLII.

1. Coast and ship charges shall not be entered in the accounts provided for by the International Telegraph Regulations.

The accounts relating to these charges shall be settled by the Administrations of the countries concerned. They shall be pre-

pared by the Administrations to which the coast stations belong, and communicated by them to the Administrations concerned. In cases in which the working of the coast stations is independent of the Administration of the country, the person working these stations may be substituted in respect of accounts for the Administration of such country.

2. As to transmission over the lines of the telegraph system the radiotelegram shall be treated in respect of accounts in conformity with the Telegraph Regulations.

3. In the case of radiotelegrams originating from ships the Administration to which the coast station is subject shall debit the Administration to which the ship station of origin is subject with the coast and ordinary telegraph charges, the total charges collected for prepaid replies, the coast and telegraph charges collected for collations, the charges appertaining to express delivery (in the case provided for in Regulation XXXVIII.) or delivery by post, and with those collected for supplementary copies (TM). The Administration to which the coast station is subject shall credit, when the case arises, through the channel of the telegraph accounts and through the medium of the offices which have taken part in the transmission of the radiotelegrams, the Administration to which the office of destination is subject with the total charges relating to prepaid replies. With regard to telegraph charges and charges relating to express delivery or delivery by post, and to supplementary copies, the procedure shall be in conformity with the telegraph regulations, the coast station being regarded as the telegraph office of origin.

In the case of radiotelegrams intended for a country lying beyond that to which the coast station belongs, the telegraph charges to be liquidated conformably to the above provisions are those which arise either from tables "A" and "B" appended to the International Telegraph Regulations or from special arrangements concluded between the Administrations of adjoining countries, and published by those Administrations, and not the charges which might be made under the special provisions of Regulations XXIII. (paragraph 1) and XXVII. (paragraph 1) of the Telegraph Regulations.

In the case of radiotelegrams and paid-service advices addressed to ships, the Administration to which the office of origin is subject shall be debited directly by that to which the coast station is subject with the coast and ship charges. Nevertheless,

the total charges appertaining to prepaid replies shall be credited, if there is occasion, from country to country through the channel of the telegraph accounts, until they reach the Administration to which the coast station is subject. In respect of the telegraph charges and charges relating to delivery by post and for supplementary copies, the procedure shall be in conformity with the telegraph regulations. The Administration to which the coast station is subject shall credit that to which the ship of destination is subject with the ship charge, if there is occasion, with the charges belonging to the intermediate ship stations, with the total charge collected for prepaid replies, with the ship charge relating to collation, and also with the charges made for preparing supplementary copies and for delivery by post.

The paid service advices, and the prepaid replies themselves, shall be treated, in the radiotelegraph accounts, in all respects like other radiotelegrams.

In the case of radiotelegrams forwarded by means of one or two intermediate ship stations, each of the latter shall debit the ship station of origin, if the radiotelegram is one coming from a ship, or the ship station of destination if the radiotelegram is one intended for a ship, with the ship charge due to it for transit.

4. In principle the settlement of account appertaining to exchanges between ship stations shall be made directly as between the companies working those stations, the station of origin being debited by the station of destination.

5. The monthly accounts serving as a basis for the special accounting in respect of radiotelegrams shall be drawn up radiotelegram by radiotelegram, with all necessary particulars, and within a period of six months counting from the month to which they belong.

6. The Governments reserve to themselves the option of making between themselves and with private companies (contractors working radiotelegraphic stations, shipping companies, etc.) special arrangements with a view to the adoption of other provisions respecting accounts.

XII.—INTERNATIONAL BUREAU.

XLIII.

The supplementary expenses resulting from the work of the International Bureau in connection with radiotelegraphy must not exceed 80,000 fcs. per annum, not including special expenses to which the meeting of an International Conference gives rise.

The Administrations of the contracting States shall be, for purposes of contribution towards the expenses, divided into six classes as follows :—

1st Class.—Union of South Africa, Germany, United States of America, Alaska, Hawaii, and the other American possessions in Polynesia, the Philippine Islands, Porto Rico and the American possessions in the Antilles, the zone of the Panama Canal, the Argentine Republic, Australia, Austria, Brazil, Canada, France, Great Britain, Hungary, British India, Italy, Japan, New Zealand, Russia, Turkey.

2nd Class.—Spain.

3rd Class.—Russian Central Asia (littoral of the Caspian Sea), Belgium, Chili, Chosen, Formosa, Japanese Saghalen and the leased territory of Qantung, Dutch Indies, Norway, Holland, Portugal, Roumania, Western Siberia (littoral of the Arctic Ocean), Eastern Siberia (littoral of the Pacific Ocean), Sweden.

4th Class.—German East Africa, German South-West Africa, The Cameroons, Togoland, German Pacific Protectorates, Denmark, Egypt, Indo-China, Mexico, Siam, Uruguay.

5th Class.—French West Africa, Bosnia-Herzegovina, Bulgaria, Greece, Madagascar, Tunis.

6th Class.—French Equatorial Africa, Portuguese West Africa, Portuguese East Africa and the Portuguese possessions in Asia, Bokhara, the Belgian Congo, the Colony of Curaçoa, the Spanish Colony of the Gulf of Guinea, Erythrea, Khiva, Morocco, Monaco, Persia, San Marino, Italian Somaliland.

XLIV.

The various Administrations shall forward to the International Bureau a form modelled on that hereto appended (see pp. 71 and 72) and containing the particulars enumerated in the form with regard to the stations covered by Clause V. of the Regulations. Any modifications which may take place and additions shall be communicated by the Administrations to the International Bureau from the 1st to the 10th of each month. With the help of these communications the International Bureau will draw up the Nomenclature provided for by Regulation V. The Nomenclature shall be distributed to the Administrations concerned. It may also, with the supplements relating thereto, be sold to the public at cost price.

The International Bureau shall take care that the adoption of identical call signals for radiotelegraph stations be avoided.

XIII. — METEOROLOGICAL TRANSMISSIONS, TIME SIGNALS, AND OTHER TRANSMISSIONS.

XLV.

1. The Administrations shall take the necessary steps to supply their coast stations with meteorological telegrams containing the particulars of interest to the district of such stations. These telegrams, the text of which must not exceed twenty words, shall be sent to the ships which ask for them. The charge for these meteorological telegrams shall be carried to the account of the ships to which they are addressed.

2. The meteorological observations, made by certain ships appointed for that purpose by the country to which they belong, may be sent once a day as paid service advices to the coast stations authorised to receive them by the Administrations concerned, who shall also appoint the meteorological offices to which these observations shall be addressed by the coast station.

3. Time signals and meteorological telegrams shall be transmitted in succession one to another in such a way that the total duration of their transmission does not exceed ten minutes. In principle, while they are being sent, all radiotelegraph stations, transmission by which might disturb the reception of these signals and telegrams, shall keep silent so as to allow all stations which desire to do so to receive these telegrams and signals. Exception shall be made in the case of distress calls and State telegrams.

4. The Administrations shall facilitate the communication to the marine information agencies which they may appoint of the information respecting wrecks and casualties at sea, or presenting a general interest for navigation, which the coast stations can communicate regularly.

XIV.—MISCELLANEOUS PROVISIONS.

XLVI.

Transmission exchanged between ship stations must be carried out in such a way as not to interfere with the service of coast stations, as the latter must have, as a general rule, right of priority for public correspondence.

XLVII.

Coast stations and ship stations shall be bound to take part in the retransmission of radiotelegrams in cases in which com-

munication cannot be established directly between the stations of origin and destination.

Nevertheless, the number of transmissions shall be limited to two.

In the case of radiotelegrams intended for *terra firma* use may only be made of retransmissions to reach the nearest coast station.

Retransmission shall be in all cases subject to the condition that the intermediate station which receives the radiotelegram in transit is in a position to send it on.

XLVIII.

If the transmission of a radiotelegram is carried out partly on the telegraph lines or through radiotelegraph stations belonging to a non-contracting Government, such radiotelegram may be sent forward, subject to the reservation that at least the Administrations to which these lines or stations belong shall have declared that they are willing to apply, when the case arises, the provisions of the Convention and of the Regulations, which are indispensable, in order that radiotelegrams may be regularly forwarded, and that accounting may be assured.

Such declaration shall be made to the International Bureau, and brought to the knowledge of the offices of the Telegraph Union.

XLIX.

The modifications of the present Regulations which may be rendered necessary in consequence of the decisions of future Telegraph Conferences shall come into force on the date fixed for the application of the provisions decided upon by each one of these later Conferences.

L.

The provisions of the International Telegraph Regulations shall apply by analogy to radiotelegraph correspondence in so far as they are not contrary to the provisions of the present Regulations.

The following in particular apply to radiotelegraph correspondence :—

The provisions of Article XXVII., paragraphs 3 to 6, of the Telegraph Regulations referring to the collection of charges; those of Articles XXXVI. and XLI. referring to the indication of the route to be taken; those of Articles LXXV., paragraph 1, LXXVIII., paragraphs 2 to 4, and LXXIX., para-

graphs 2 to 4, relating to preparing of accounts. Nevertheless, first, the period of six months provided by paragraph 2 of Article LXXIX. of the Telegraph Regulations for the verification of accounts is extended to nine months in the case of radiotelegrams; second, the provisions of Article XVI., paragraph 2, are not considered as authorising the free transmission by radiotelegraph stations of service telegrams relating exclusively to the telegraph service, nor the free transmission over the lines of the telegraph system of service telegrams relating exclusively to the radiotelegraph service; third, the provisions of Article LXXIX., paragraphs 3 and 5, do not apply to radiotelegraph accounting. For the purposes of applying the provisions of the Telegraph Regulations coast stations shall be regarded as offices of transit, except when the Radiotelegraphic Regulations stipulate expressly that these stations are to be considered as offices of origin or destination

Conformable to Article II. of the Convention of London the present regulations will come into force on the 1st of July, 1913.

In witness whereof the respective Plenipotentiaries have signed these Regulations on a single copy, which will remain deposited in the archives of the British Government, and of which a copy will be sent to each party.

APPENDIX

I.

Table referred to in Regulation XLIV. (p. 68).

(*a*) Coast Stations

Name.	Nationality.	Geographical Position. E=East longitude; O=West longitude; N=North latitude; S=South latitude. Territorial subdivisions.	Call Signal.	Normal Range in Nautical Miles.	Radiotelegraph System, with the characteristics of the System of emission.	Wave-lengths in metres (the normal wave-length is underlined).

Nature of Services effected.	Working hours (Time according to the Meridian).	Coast Charge.		*Observations* (if occasion, Time and Method of sending Time-Signals and Meteorological Telegrams).
		Per Word in Francs.	Minimum per Radiotelegram in Francs.	

(b) Ship Stations.

Name.	Nationality.	Call Signal.	Normal Range in Nautical Miles.	Radiotelegraph System, with the characteristics of the System of emission.	Wave-lengths in Metres.

Nature of Services effected.	Working Hours.	Ship Charge.		Observations (if occasion, Name and Address of the person working the Station).
		Per Word in Francs.	Minimum per Radiotelegram in Francs.	

1° Warships.

2° Merchant Ships.

II.

LIST OF ABBREVIATIONS TO BE USED IN RADIOTELEGRAPH TRANSMISSIONS (referred to in Article XXII, p. 57).

Abbreviation. 1.	Question. 2.	Answer or Advice. 3.
—.—. ——.— (CQ)	.. .. ..	Inquiry signal employed by a station which desires to correspond.
—.—. (TR)	.. ..	Signal announcing the sending of indications concerning a ship station (article XXVIII).
——..——(!)	.. ..	Signal indicating that a station is about to send with high power.
PRB	Do you wish to communicate with my station by means of the International Signal Code ?	I wish to communicate with your station by means of International Signal Code.
QRA	What is the name of your station ?	This station is ....
QRB	How far are you from my station ?	The distance between our stations is .... nautical miles.
QRC	What are your true bearings ? ..	My true bearings are .... degrees.
QRD	Where are you bound ?	I am bound for ....
QRF	Where are you coming from ? ..	I am coming from ....
QRG	To what company or line of navigation do you belong ?	I belong to ....
QRH	What is your wave-length ? ..	My wave-length is .... metres.
QRJ	How many words have you to transmit ?	I have .... words to transmit.
QRK	How are you receiving ?	I am receiving well.
QRL	Are you receiving badly ? Shall I transmit 20 times ...—. so that you can adjust your apparatus ?	I am receiving badly. Transmit 20 times ...—. so that I can adjust my apparatus.
QRM	Are you disturbed ?	I am disturbed.
QRN	Are the atmospherics very strong	The atmospherics are very strong.
QRO	Shall I increase my power ? ..	Increase your power.
QRP	Shall I decrease my power ? ..	Decrease your power.
QRQ	Shall I transmit faster ?	Transmit faster.
QRS	Shall I transmit more slowly ? ..	Transmit more slowly.
QRT	Shall I stop transmitting ?	Stop transmitting.
QRU	Have you anything for me ? ..	I have nothing for you.
QRV	Are you ready ?	I am ready. All is in order.
QRW	Are you busy ?	I am busy with another station (or with .... please do not interrupt).

QRX	Shall I wait?	Wait. I will call you at .... o'clock (or when I want you).
QRY	What is my turn?	Your turn is No. ....
QRZ	Are my signals weak?	Your signals are weak.
QSA	Are my signals strong?	Your signals are strong.
QSB	Is my tone bad?	The tone is bad.
	Is my spark bad?	The spark is bad.
QSC	Is the spacing bad?	The spacing is bad.
QSD	Let us compare watches. My time is .... What is your time?	The time is ....
QSF	Are the radiotelegrams to be transmitted alternately or in series?	Transmission will be in alternate order.
QSG	—	Transmission will be in series of five radiotelegrams.
QSH	—	Transmission will be in series of ten radiotelegrams.
QSJ	What is the charge to collect for ....?	The charge to collect is ....
QSK	Is the last radiotelegram cancelled?	The last radiotelegram is cancelled.
QSL	Have you got the receipt?	Please give a receipt.
QSM	What is your true course?	My true course is .... degrees.
QSN	Are you communicating with land?	I am not communicating with land.
QSO	Are you in communication with another station (or with ....)?	I am in communication with .... (through the medium of ....).
QSP	Shall I signal to .... that you are calling him?	Inform .... that I am calling him.
QSQ	Am I being called by ....? ..	You are being called by ....
QSR	Will you dispatch the radiotelegram?	I will forward the radiotelegram.
QST	Have you received a general call? ..	General call to all stations.
QSU	Please call me when you have finished (or at .... o'clock)	I will call you when I have finished.
QSV	Is public correspondence engaged?	Public correspondence is engaged. Please do not interrupt.
QSW	Must I increase the frequency of my spark?	Increase the frequency of your spark.
QSY	Shall I transmit with a wave-length of .... metres?	Let us transfer to the wave-length of .... metres.
QSX	Must I diminish the frequency of my spark?	Diminish the frequency of your spark.

When an abbreviation is followed by a mark of interrogation it applies to the question indicated in respect of that abbreviation.

EXAMPLES.

Station.		
A	QRA?	What is the name of your station?
B	QRA Campania	This is the Campania.
A	QRG?	To what company or line of navigation do you belong?
B	QRG Cunard. QRZ	I belong to the Cunard Line. Your signals are weak.

Station A then increases the power of its transmitter and sends:

A	QRK?	How are you receiving?
B	QRK	I am receiving well.
	QRB 80	The distance between our stations is 80 nautical miles.
	QRC 62	My true bearings are 62 degrees, etc.

INTERNATIONAL CONVENTION
ON
SAFETY OF LIFE AT SEA

London, January 20, 1914.

THE London International Conference on the Safety of Life at Sea, by which the Convention signed on January 20th, 1914, has been drawn up, met for the first time on November 12th, 1913, at the Foreign Office, London. The suggestion that such a Conference should be held emanated from the German Emperor, and the task of convening it was undertaken by the British Government. The following States were represented:—Great Britain, Germany, the United States, Australia, Austria-Hungary, Belgium, Canada, Denmark, Spain, France, Italy, Japan, Norway, the Netherlands, Russia, Sweden, and New Zealand. The delegations from the different States were composed, not of the representatives of the shipping trade, but of administrators, experts and jurists.

Lord Mersey was appointed Chairman of the Conference. To deal with the specific subjects submitted to it the Conference appointed five sub-committees, together with a sixth sub-committee for drafting the Convention, which was to embody the recommendations of the Committees as approved by the whole Conference.

The Convention contains 74 Articles, of which we present below the articles governing the use of wireless telegraphy:—

CHAPTER I.—SAFETY OF LIFE AT SEA.

Article 1.—The High Contracting Parties undertake to give effect to the provisions of this Convention, for the purpose of securing safety of life at sea, to promulgate all regulations and to take all steps which may be necessary to give the Convention full and complete effect.

The provisions of this Convention are completed by Regulations which have the same force and take effect at the same time as the Convention. Every reference to the Convention implies at the same time a reference to the Regulations annexed thereto.

CHAPTER II.—SHIPS TO WHICH THIS CONVENTION APPLIES.

Article 2.—Except where otherwise provided by this Convention, the merchant ships of any of the States of the High Contracting Parties, which are mechanically propelled, which carry more than 12 passengers, and which proceed from a port of one of the said States to a port situated outside that State, or conversely, are subject to the provisions of this Convention. Ports situated in the Colonies, Possessions, or Protectorates of the High Contracting Parties are considered to be ports outside the States of the High Contracting Parties.

Persons who are on board by reason of *force majeure* or in consequence of the obligation laid upon the master to carry shipwrecked or other persons, are not deemed to be passengers.

Article 3.—There are excepted from this Convention, save in the cases where the Convention otherwise provides, ships making voyages specified in a schedule to be communicated by each High Contracting Party to the British Government at the time of ratifying the Convention.

No schedule may include voyages in the course of which the ships go more than 200 sea miles from the nearest coast.

Each High Contracting Party has the right subsequently to modify its schedule of voyages in conformity with this Article on condition that it notifies the British Government of such modification.

Each High Contracting Party has the right to claim from another Contracting Party the benefit of the privileges of the Convention for all of its ships which are engaged in any one of the voyages mentioned in its own schedule. For this purpose the Party claiming such benefit shall impose on the said ships the obligations prescribed by the Convention in so far as, having regard to the nature of the voyage, these obligations would not be unnecessary or unreasonable.

Article 4.—No ship, not subject to the provisions of the Convention at the time of its departure, can be subjected to the Convention in the course of its voyage, if stress of weather or any other cause of *force majeure* compels it to take refuge in a port of one of the States of the High Contracting Parties.

CHAPTER III.—SAFETY OF NAVIGATION.

Article 5.—When the expression " every ship " is used in this chapter and in the corresponding part of the annexed Regulations, it includes all merchant ships, whether they are the ships

defined in Article 2 or not, which belong to any of the Contracting States.

Article 6.—The High Contracting Parties undertake to take all steps to ensure the destruction of derelicts in the northern part of the Atlantic Ocean east of a line drawn from Cape Sable to a point situated in latitude 34° north and longitude 70° west. Further, they will establish in the North Atlantic with the least possible delay a service for the study and observation of ice conditions and a service of ice patrol. For this purpose:—

Two vessels shall be charged with these three services.

During the whole of the ice season they shall be employed in ice patrol.

During the rest of the year the two vessels shall be employed in the study and observation of ice conditions and in the destruction of derelicts; nevertheless the study and observation of ice conditions shall be effectively maintained, in particular from the beginning of February to the opening of the ice season.

While the two vessels are employed in ice patrol the High Contracting Parties, to the extent of their ability and so far as the exigencies of the Naval Service will permit, will send warships or other vessels to destroy any dangerous derelicts, if this destruction is considered necessary at that time.

Article 7.—The Government of the United States is invited to undertake the management of the three services of derelict destruction, study and observation of ice conditions, and ice patrol. The High Contracting Parties which are specially interested in these services, and whose names are given below, undertake to contribute to the expense of establishing and working the said services in the following proportions:—

	Per cent.
Austria-Hungary	2
Belgium	4
Canada	2
Denmark	2
France	15
Germany	15
Great Britain	30
Italy	4
Netherlands	4
Norway	3
Russia	2
Sweden	2
United States of America	15

Each of the High Contracting Parties has the right to discontinue its contribution to the expense of working these services after September 1st, 1916. Nevertheless, the High Contracting Party which avails itself of this right will continue responsible for the expenses of working up to the 1st September following the date of denunciation of the Convention on this particular point. To take advantage of the said right, it must give notice to the other Contracting Parties at least six months before the said 1st September; so that, to be free from its obligations on September 1st, 1916, it must give notice on March 1st, 1916, at the latest, and similarly for each subsequent year.

In case the United States Government should not accept the proposal made to them, or in case one of the High Contracting Parties, for any reason, should not assume responsibility for the pecuniary contribution defined above, the High Contracting Parties shall settle the question in accordance with their mutual interests.

The Government of the High Contracting Party which undertakes the management of the service of derelict destruction is invited to devise means of granting, at the expense of this service, to merchant ships, which have contributed in an effective manner to the destruction of ocean derelicts, rewards to be fixed by the Government in accordance with the services rendered.

The High Contracting Parties which contribute to the cost of the three above-mentioned services shall have the right by common consent to make from time to time such alterations in the provisions of this Article and of Article 6 as appear desirable.

Article 8.—The master of every ship which meets with dangerous ice or a dangerous derelict is bound to communicate the information by all the means of communication at his disposal to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate.

Every Administration which receives intelligence of dangerous ice or a dangerous derelict shall take all steps which it thinks necessary for bringing the information to the knowledge of those concerned and for communicating it to the other Administrations.

The transmission of messages respecting ice and derelicts is free of cost to the ships concerned.

It is desirable that the said information should be sent in a uniform manner. For this purpose a code, the use of which is optional, appears in Article I. of the Regulations annexed hereto.

Article 9.—The master of every ship fitted with a radio-telegraph installation, on becoming aware of the existence of an imminent and serious danger to navigation, shall report it immediately in the manner prescribed by Article II. of the Regulations annexed hereto.

Article 10.—When ice is reported on, or near, his course, the master of every ship is bound to proceed at night at a moderate speed, or to alter his course so as to go well clear of the danger zone.

Article 11.—The ships defined by Article 2 shall have on board a Morse signalling lamp of sufficient range.

The use of Morse signals is regulated by the Code appearing in Article III., as well as by Article IV. of the Regulations annexed hereto.

Article 12.—The use of the international distress signals for any other purpose than that of signals of distress is prohibited on every ship.

The use of private signals which are liable to be confused with the international distress signals is prohibited on every ship.

Article 13.—The selection of the routes across the North Atlantic in both directions is left to the responsibility of the steamship companies. Nevertheless the High Contracting Parties undertake to impose on these companies the obligation to give public notice of the regular routes which they propose their vessels should follow, and of any changes which they make in them.

The High Contracting Parties undertake, further, to use their influence to induce the owners of all vessels crossing the Atlantic to follow as far as possible the routes adopted by the principal companies.

Article 14.—The High Contracting Parties undertake to use all diligence to obtain from the Governments which are not parties to this Convention their agreement to the revision of the International Regulations for Preventing Collisions at Sea as indicated below:—

(*A*) The Regulations shall be completed or revised in regard to the following points:—

(1) The second white light.

(2) The stern light.

(3) A day signal for motor vessels.

(4) A sound signal for a vessel towed.

(5) The prohibition of signals similar to distress signals.

(*B*) Articles 2, 10, 14, 15, 31 of the said Regulations shall be amended in accordance with the following provisions:—

Article 2. The second white mast-head light to be compulsory.

Article 10. A permanent fixed stern light to be compulsory.

Article 14. A special day signal to be compulsory for motor vessels.

Article 15. A special sound signal to be established for use by a vessel in tow, or if the tow is composed of several vessels, by the last vessel of the tow.

Article 31. Article 31 to be modified in the following manner:—Add to the lists of both day and night signals the international radiotelegraph distress signal.

Article 15.—The Governments of the High Contracting Parties undertake to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that from the point of view of safety of life at sea, the ships defined in Article 2 shall be sufficiently and efficiently manned.

Chapter IV., which contains Articles 16 to 30, refers to construction.

Chapter V.—Radiotelegraphy.

Article 31.—All merchant ships belonging to any of the Contracting States, whether they are propelled by machinery or by sails, and whether they carry passengers or not, shall, when engaged on the voyages specified in Article 2, be fitted with a radiotelegraph installation if they have on board fifty or more persons in all.

Advantage may not be taken of the provisions of Articles 2 and 3 of this Convention to exempt a ship from the requirements of this chapter.

Article 32.—Ships on which the number of persons on board is exceptionally and temporarily increased up to or beyond fifty as the result of *force majeure,* or because the master is under the necessity of increasing the number of his crew to fill the places of those who are ill, or is obliged to carry shipwrecked or other persons, are exempted from the above obligation.

Moreover, the Governments of each of the Contracting States, if they consider that the route and the conditions of the voyage are such as to render a radiotelegraph installation un-

reasonable or unnecessary, may exempt from the above requirement the following ships :—

(1) Ships which in the course of their voyage do not go more than 150 sea miles from the nearest coast.

(2) Ships on which the number of persons on board is exceptionally or temporarily increased up to or beyond fifty by the carriage of cargo hands for a part of the voyage, provided that the said ships are not going from one continent to another, and that, during that part of their voyage, they remain within the limits of latitude 30° N. and 30°. S.

(3) Sailing vessels of primitive build, such as *dhows, junks,* etc., if it is practically impossible to instal a radiotelegraph apparatus.

Article 33.—Ships which, in accordance with Article 31 above, are required to be fitted with a radiotelegraph installation are divided, for the purpose of radiotelegraph service, into three classes, in accordance with the classification established for ship stations in Article XIII. (*b*) of the Regulations annexed to the Radiotelegraph Convention, signed in London on July 5th, 1912, viz. :—

First Class.—Ships having a continuous service.

There shall be placed in the First Class ships which are intended to carry twenty-five or more passengers :—

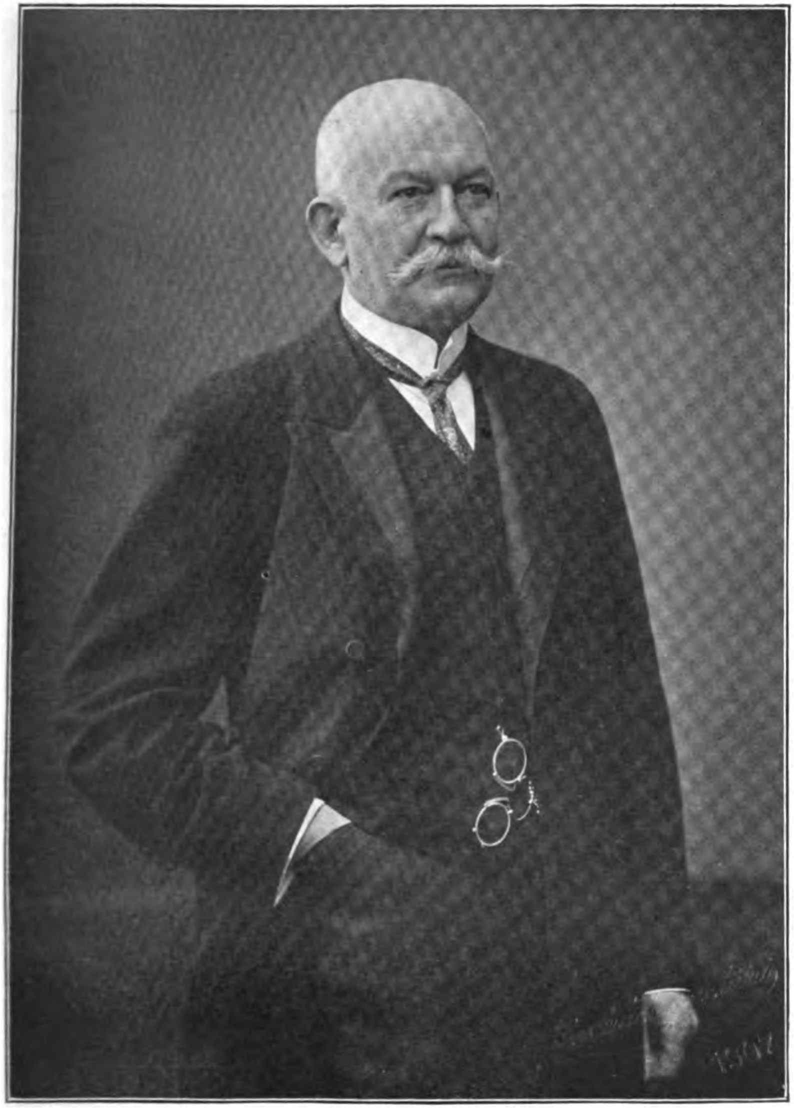
(1) if they have an average speed in service of fifteen knots or more;

(2) if they have average speed in service of more than thirteen knots, but only subject to the two-fold condition that they have on board two hundred persons or more (passengers and crew), and that, in the course of their voyage, they go a distance of more than five hundred sea miles between any two consecutive ports. Nevertheless these ships may be placed in the Second Class on condition that they have a continuous watch.

Second Class.—Ships having a service of limited duration.

There shall be placed in the Second Class all ships which are intended to carry twenty-five or more passengers, if they are not, for other reasons, placed in the First Class.

Ships placed in the Second Class must, during navigation, maintain a continuous watch for at least seven hours a day, and a watch of ten minutes at the beginning of every other hour.



Herr Kraetke
Minister of Posts and Telegraphs, Germany.

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Third Class.—Ships which have no fixed periods of service.

All ships which are placed neither in the First nor in the Second Class shall be placed in the Third Class.

The owner of a ship placed in the Second or in the Third Class has the right to require that, if the ship complies with all the requirements for a superior class, a statement to the effect that it belongs to that superior class shall be inserted in the Safety Certificate.

Article 34.—Ships which are required by Article 31 above to be fitted with a radiotelegraph installation shall be required, by the Governments of the countries to which they belong, to maintain a continuous watch during navigation as soon as the said Governments consider that it will be of service for the purpose of safety of life at sea.

Meanwhile, the High Contracting Parties undertake to require, from the date of the ratification of the present Convention, subject to the delays specified below, a continuous watch on the following ships:—

(1) Ships whose average speed in service exceeds 13 knots, which have on board 200 persons or more, and which, in the course of their voyage, go a distance of more than 500 sea miles between two consecutive ports, when these ships are placed in the Second Class.

(2) Ships in the Second Class, for the whole of the time during which they are more than 500 sea miles from the nearest coast.

(3) Other ships specified in Article 31, when they are engaged in the Trans-Atlantic trade, or when they are engaged in other trades if their route takes them more than 1,000 sea miles from the nearest coast.

Ships connected with all kinds of fishing business, including whaling, which are required to be fitted with a radiotelegraph installation, shall not be required to maintain a continuous watch.

The continuous watch may be kept by one or more operators, holding certificates in accordance with Article X. of the Regulations annexed to the International Radiotelegraph Convention, 1912, together, if necessary, with one or more certificated watchers. Nevertheless, if an efficient automatic calling apparatus is invented, the continuous watch may be maintained by this

means by agreement between the Governments of the High Contracting Parties.

By "certificated watcher" is meant any person holding a certificate issued under the authority of the Administration concerned. To obtain this certificate, the applicant must prove that he is capable of receiving and understanding the radiotelegraph distress signal and the safety signal described in the Regulations annexed hereto.

The High Contracting Parties undertake to take steps to ensure that the certificated watchers observe the secrecy of correspondence.

Article 35.—The radiotelegraph installations required by Article 31 above shall be capable of transmitting clearly perceptible signals from ship to ship over a range of at least 100 sea miles by day under normal conditions and circumstances.

Every ship which is required, in conformity with the provisions of Article 31 above, to be fitted with a radiotelegraph installation, shall, whatever be the class in which it is placed, be provided in accordance with Article XI. of the Regulations annexed to the International Radiotelegraph Convention, 1912, with an emergency installation, every part of which is placed in a position of the greatest possible safety to be determined by the Government of the country to which the ship belongs.

In all cases the emergency installation must be placed, in its entirety, in the upper part of the ship, as high as practically possible.

The emergency installation includes, as provided by Article XI. of the Regulations annexed to the International Radiotelegraph Convention, 1912, an independent source of energy capable of being put into operation rapidly and of working for at least six hours with a minimum range of eighty sea miles for ships in the First Class and fifty sea miles for ships in the two other classes.

If the normal installation, which, in accordance with this Article, has a range of at least one hundred sea miles, satisfies all the conditions prescribed above, an emergency installation is not required.

The licence provided for in Article IX. of the Regulations annexed to the International Radiotelegraph Convention, 1912, may not be issued unless the installation complies both with the provisions of that Convention and also with the provisions of this Convention.

Article 36.—The matters governed by the International Radiotelegraph Convention, 1912, and the Regulations annexed thereto, and in particular the radiotelegraph installations on ships, the transmission of messages, and the certificates of the operators, remain and will continue subject to the provisions:

(1) of that Convention and the Regulations annexed thereto, or of any other instruments which may in the future be substituted therefor;

(2) of this Convention, in regard to all the points in which it supplements the aforementioned documents.

Article 37.—Every master of a ship who receives a call for assistance from a vessel in distress is bound to proceed to the assistance of the persons in distress.

Every master of a vessel in distress has the right to requisition from among the ships which answer his call for assistance the ship or ships which he considers best able to render him assistance, but he must exercise this right only after consultation, so far as may be possible, with the masters of those ships. Such ships are then bound to comply immediately with the requisition by proceeding with all speed to the assistance of the persons in distress.

The masters of the ships which are required to render assistance are released from this obligation as soon as the master or masters requisitioned have made known that they will comply with the requisition, or as soon as the master of one of the ships which has reached the scene of the casualty has made known to them that their assistance is no longer necessary.

If the master of a ship is unable, or considers it unreasonable or unnecessary, in the special circumstances of the case, to go to the assistance of the vessel in distress, he must immediately inform the master of the vessel in distress accordingly. Moreover, he must enter in his log-book the reasons justifying his action.

The above provisions do not prejudice the International Convention for the unification of certain rules with respect to Assistance and Salvage at Sea, signed at Brussels on September 23rd, 1910, and, in particular, the obligation to render assistance laid down in Article II. of that Convention.

Article 38.—The High Contracting Parties undertake to take all steps necessary for giving effect to the provisions of this chapter with the least possible delay. Nevertheless, they may allow:

A delay not exceeding one year, from the date of the

ratification of this Convention, for the provision and training of operators and for the installation of the apparatus on ships placed in the First and Second Classes.

A delay not exceeding two years, from the date of the ratification of this Convention, for the provision and training of the operators and watchers on the ships in the Third Class, for the installation of the apparatus on ships in the Third Class and for the establishment of a continuous watch on ships placed in the Second and Third Classes.

CHAPTER VI.—Refers to Life-saving Appliances and Fire Protection.

REGULATIONS.

SAFETY OF NAVIGATION.

ARTICLE 1.

CODE FOR THE TRANSMISSION BY RADIOTELEGRAPHY OF INFORMATION RELATING TO ICE, DERELICTS, AND WEATHER.

INSTRUCTIONS.

Transmission of Information.—The transmission of information concerning ice and derelicts is obligatory. This information may be sent from ship to ship or to the Hydrographic Office, Washington, either in clear or by means of the abbreviations used in Part I. of this Code.

The transmission of information relating to weather is optional. Part II. of this Code may be used for this purpose, but may be modified at any time by the Meteorological Congress.

Information required:

PART I.—ICE AND DERELICTS.

1. The kind of ice or derelict observed.
2. The position of ice or derelict when last determined.

PART II.—METEOROLOGICAL INFORMATION.

1. The direction and force of the wind
2. The set and velocity of the current.
3. Weather or state of the sky at a fixed hour.
4. Height of barometer and air temperature.
5. Barometric tendency and sea-surface temperature.

The time to be adopted:

In all radiotelegrams relating to ice or derelicts the time shall be given in Greenwich mean time.

The Address:

Reports, when sent to the Hydrographic Office, Washington, should be addressed "Hydrographic"; reports to the Meteorological Office, London, should be addressed "Meteorology."

The Message:

1. When sending information about ice or derelicts alone, two groups of five figures each are used, preceded by the word "ice"; these groups may be repeated as often as necessary.

2. If meteorological information is to be sent in addition, a further four groups of five figures each are used, preceded by the word "weather." These groups are inserted at the end of the message after all the information relating to ice has been given.

N.B.—If the message contains the word "weather," all the code groups before that word give information relating to ice, and those after the word "weather" give meteorological information. If there is no word "weather" in the message, it only contains information about ice. (See examples of the two kinds of message given in this Article.)

PART I.

Ice and Derelicts.

Information respecting ice and derelicts is given by means of ten figures divided into two groups of five figures each. These groups are preceded by the word "ice."

Two figures... The day of the month (*dd*), according to Code I.
One figure ... The time of observation (*T*), according to Code II.
One figure ... The kind of ice observed (*I*), according to Code III.
Three figures The latitude of the ice observed ($p\ p\ p$), to tenths of a degree (see table below).
Three figures The longitude of the ice observed ($p'\ p'\ p'$), to tenths of a degree (see table below).

The first group consists of $ddTIp$.
The second group consists of $ppp'p'p'$.

Codes.

Code I.—*Day of the Month.*

The day of the month is given by two figures, of which the first may be zero: 01 to 31.

Code II.—*Time of observation.*

The time of observation is included between—

	Code No.
1 a.m. and 4 a.m. ... Greenwich Mean Time ...	1
4 a.m. and 7 a.m.	2
7 a.m. and 10 a.m.	3
10 a.m. and 1 p.m.	4
1 p.m. and 4 p.m.	5
4 p.m. and 7 p.m.	6
7 p.m. and 10 p.m.	7
10 p.m. and 1 a.m.	8

Code III.—*Nature of Ice or Derelict observed.*

0. No ice observed.
1. Single iceberg. Huge mass of floating ice.
2. Several icebergs.
3. Numerous icebergs.
4. Floeberg. Thick piece of salt-water ice like a small iceberg.
5. Field ice. Ice extending as far as the eye can reach, but through which it is possible to navigate.
6. Pack ice. Pieces of ice broken from berg or floe, partly closed together.
7. Land ice. Ice attached to the shore since the winter.
8. Derelict.
9. (Not allotted.)

EXAMPLE.

Message sent from Ship to Ship.

—	First Message.	Coded as	Second Message.	Coded as	Third Message.	Coded as	Fourth Message.	Coded as
Date of observation	15	15	15	15	15	15	16	16
Time of observation	10 a.m.–1 p.m.	4	4 p.m.–7 p.m.	6	7 p.m.–10 p.m.	7	4 p.m.–7 a.m.	2
Nature of ice or derelict	Field	5	Numerous icebergs	3	Derelict	8	Single iceberg	1
Position of ice or derelict	Latitude 45° 42′	457	Latitude 46° 5′	461	Latitude 46° 25′	464	Latitude 47° 19′	473
	Longitude 46° 11′	462	Longitude 44° 40′	447	Longitude 43° 58′	440	Longitude 40° 15′	402

The code of the above message would thus be:

S.S. to S.S.

Ice, 15454, 57462: 15634, 61447: 15784, 64440: 16214, 73402.

PART II.

Meteorological Information.

Information respecting weather, etc., is given by four groups of five figures each. These groups are preceded by the word "weather."

First Group (DDPPP):

The day of the month: two figures (*DD*), according to Code I.

The position of the ship when transmitting the message, indicated by three figures *(PPP)*, representing the 1° square in which the ship is situated, according to Code IV. and the numbered chart annexed to this Article.

Second Group (WWCCX):

Wind direction and force at 8 a.m. at the 75th meridian of west longitude: two figures *(WW)*, according to Code V.

Set and velocity of current: two figures *(CC)*, according to Code VI.

Weather or state of the sky at the same hour: one figure (*X*), according to Code VII.

Third Group (BBBAA):

The barometric height to tenths of a millimetre at 8 a.m. at the 75th meridian of west longitude: three figures *(BBB)*, according to Code VIII.

Air temperature at the same hour: two figures *(AA)*, according to Code IX.

Fourth Group (bbSSS):

Barometric tendency at 8 a.m. at the 75th meridian of west longitude: two figures *(bb)*, according to Code X.

Sea surface temperature at the same hour: three figures *(SSS)*, according to Code XI.

Codes.

Code IV.—*Position of Ship.*

A chart gives the numbers to be assigned to each 1° square in the North Atlantic. The position of the ship, when the meteorological data given in Part II. were observed, is indicated by the three figures representing the 1° square in which the ship is situated. For example:—A position 51° 55′ N., 26° 49′ W. would be reported as 561.

Code V.

Wind Direction (to 16 points) and *Wind Force* at 8 a.m. mean time at the 75th meridian of west longitude *(WW)*.

—	Wind Force, Beaufort Scale.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	N.
Calm	0	00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Light Breeze ...	1, 2, or 3	01	07	13	19	25	31	37	43	49	55	61	67	73	79	85	91
Moderate breeze	4 or 5	02	08	14	20	26	32	38	44	50	56	62	68	74	80	86	92
Strong wind ...	6 or 7	03	09	15	21	27	33	39	45	51	57	63	69	75	81	87	93
Gale Force ...	8 or 9	04	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
Storm Force ...	10 or 11	05	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
Hurricane ...	12	06	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96

N.B.—The wind direction is to be referred to true bearings.

Code VI.

Direction (to 16 points) and *Velocity of the Current (CC)*.

Nautical Miles. per hour.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	S.S.W	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	N.
0·25	01	07	13	19	25	31	37	43	49	55	61	67	73	79	85	91
0·5	02	09	14	20	26	32	38	44	50	56	62	68	74	80	86	92
1	03	09	15	21	27	33	39	45	51	57	63	69	75	81	87	93
2	04	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
3	05	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
4	06	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
	00	No current.														
	99	No observation.														

N.B.—The current is to be referred to true bearings.

Code VII.

The State of the Sky at 8 a.m. mean time at the 75th meridian of west longitude:

0. Sky quite clear.
1. Sky quarter clouded.
2. Sky half clouded.
3. Sky three-quarters clouded.
4. Sky entirely overcast.
5. Rain falling.
6. Snow or hail falling.
7. Haze or mist.
8. Fog.
9. Thunderstorm.

Code VIII.—*Height of Barometer.*

The reading of the mercury barometer is to be corrected for index error, and reduced to 0° C. and sea level. A table of corrections is given below.

The corrected reading is coded by omitting the first figure of the barometer reading in tenths of a millimetre: for example, 761·2 mm. is coded as 612.

A table for converting hundredths of an inch to tenths of a millimetre is given below.

Code IX.

Air Temperature is coded in two figures according to the following table:—

Degrees Centigrade.	Degrees Fahrenheit.	Code No.	Degrees Centigrade.	Degrees Fahrenheit.	Code No.
—15·0	5·0	00	10·0	50·0	50
—14·5	5·9	01	10·5	50·9	51
—14·0	6·8	02	11·0	51·8	52
—13·5	7·7	03	11·5	52·7	53
—13·0	8·6	04	12·0	53·6	54
—12·5	9·5	05	12·5	54·5	55
—12·0	10·4	06	13·0	55·4	56
—11·5	11·3	07	13·5	56·3	57
—11·0	12·2	08	14·0	57·2	58
—10·5	13·1	09	14·5	58·1	59
—10·0	14·0	10	15·0	59·0	60
— 9·5	14·9	11	15·5	59·9	61
— 9·0	15·8	12	16·0	60·8	62
— 8·5	16·7	13	16·5	61·7	63
— 8·0	17·6	14	17·0	62·6	64
— 7·5	18·5	15	17·5	63·5	65
— 7·0	19·4	16	18·0	64·4	66
— 6·5	20·3	17	18·5	65·3	67
— 6·0	21·2	18	19·0	66·2	68
— 5·5	22·1	19	19·5	67·1	69
— 5·0	23·0	20	20·0	68·0	70
— 4·5	23·9	21	20·5	68·9	71
— 4·0	24·8	22	21·0	69·8	72
— 3·5	25·7	23	21·5	70·7	73
— 3·0	26·6	24	22·0	71·6	74
— 2·5	27·5	25	22·5	72·5	75
— 2·0	28·4	26	23·0	73·4	76
— 1·5	29·3	27	23·5	74·3	77
— 1·0	30·2	28	24·0	75·2	78
— 0·5	31·1	29	24·5	76·1	79
0·0	32·0	30	25·0	77·0	80
0·5	32·9	31	25·5	77·9	81
1·0	33·8	32	26·0	78·8	82
1·5	34·7	33	26·5	79·7	83
2·0	35·6	34	27·0	80·6	84
2·5	36·5	35	27·5	81·5	85
3·0	37·4	36	28·0	82·4	86
3·5	38·3	37	28·5	83·3	87
4·0	39·2	38	29·0	84·2	88
4·5	40·1	39	29·5	85·1	89
5·0	41·0	40	30·0	86·0	90
5·5	41·9	41	30·5	86·9	91
6·0	42·8	42	31·0	87·8	92
6·5	43·7	43	31·5	88·7	93
7·0	44·6	44	32·0	89·6	94
7·5	45·5	45	32·5	90·5	95
8·0	46·4	46	33·0	91·4	96
8·5	47·3	47	33·5	92·3	97
9·0	48·2	48	34·0	93·2	98
9·5	49·1	49	34·5	94·1	99

Code X.—*Barometric Tendency.*

By the "barometric tendency at a given hour" is meant the amount by which the barometric height has changed during the preceding three hours. It is to be expressed in millimetres. For example, the barometric tendency at 8 a.m. could be obtained by comparing the reading taken at that hour, say 755·7 mm., with a reading taken at 5 a.m., say 759·3 mm. In this case the barometric tendency would be expressed by a fall of 3·6 millimetres. As a general rule the barometric tendency is to be determined from the trace of the barograph.

The barometric tendency is coded in two figures, according to the following table:—

Rise in Barometer.		Code No.	Fall in Barometer.		Code No.
Millimetres.	Inches.		Millimetres.	Inches.	
0·0— 0·4	0·00—0·01	01	0·0— 0·4	0·00—0·01	51
0·5— 0·9	0·02—0·03	02	0·5— 0·9	0·02—0·03	52
1·0— 1·4	0·04—0·05	03	1·0— 1·4	0·04—0·05	53
1·5— 1·9	0·06—0·07	04	1·5— 1·9	0·06—0·07	54
2·0— 2·4	0·08—0·09	05	2·0— 2·4	0·08—0·09	55
2·5— 2·9	0·10—0·11	06	2·5— 2·9	0·10—0·11	56
3·0— 3·4	0·12—0·13	07	3·0— 3·4	0·12—0·13	57
3·5— 3·9	0·14—0·15	08	3·5— 3·9	0·14—0·15	58
4·0— 4·4	0·16—0·17	09	4·0— 4·4	0·16—0·17	59
4·5— 4·9	0·18—0·19	10	4·5— 4·9	0·18—0·19	60
5·0— 5·4	0·20—0·21	11	5·0— 5·4	0·20—0·21	61
5·5— 5·9	0·22—0·23	12	5·5— 5·9	0·22—0·23	62
6·0— 6·4	0·24—0·25	13	6·0— 6·4	0·24—0·25	63
6·5— 6·9	0·26—0·27	14	6·5— 6·9	0·26—0·27	64
7·0— 7·4	0·28—0·29	15	7·0— 7·4	0·28—0·29	65
7·5— 7·9	0·30—0·31	16	7·5— 7·9	0·30—0·31	66
8·0— 8·4	0·32—0·33	17	8·0— 8·4	0·32—0·33	67
8·5— 8·9	0·34—0·35	18	8·5— 8·9	0·34—0·35	68
9·0— 9·4	0·36—0·37	19	9·0— 9·4	0·36—0·37	69
9·5— 9·9	0·38—0·38	20	9·5— 9·9	0·38—0·38	70
10·0—10·4	0·39—0·40	21	10·0—10·4	0·39—0·40	71
10·5—10·9	0·41—0·42	22	10·5—10·9	0·41—0·42	72
11·0—11·4	0·43—0·44	23	11·0—11·4	0·43—0·44	73
11·5—11·9	0·45—0·46	24	11·5—11·9	0·45—0·46	74
12·0—12·4	0·47—0·48	25	12·0—12·4	0·47—0·48	75
12·5—12·9	0·49—0·50	26	12·5—12·9	0·49—0·50	76
13·0—13·4	0·51—0·52	27	13·0—13·4	0·51—0·52	77
13·5—13·9	0·53—0·54	28	13·5—13·9	0·53—0·54	78
14·0—14·4	0·55—0·56	29	14·0—14·4	0·55—0·56	79
14·5—14·9	0·57—0·58	30	14·5—14·9	0·57—0·58	80
15·0—15·4	0·59—0·60	31	15·0—15·4	0·59—0·60	81
15·5—15·9	0·61—0·62	32	15·5—15·9	0·61—0·62	82

BAROMETRIC TENDENCY TABLE—*continued.*

Rise in Barometer.		Code No.	Fall in Barometer.		Code No.
Millimetres.	Inches.		Millimetres.	Inches.	
16·0—16·4	0·63—0·64	33	16·0—16·4	0·63—0·64	83
16·5—16·9	0·65—0·66	34	16·5—16·9	0·65—0·66	84
17·0—17·4	0·67—0·68	35	17·0—17·4	0·67—0·68	85
17·5—17·9	0·69—0·70	36	17·5—17·9	0·69—0·70	86
18·0—18·4	0·71—0·72	37	18·0—18·4	0·71—0·72	87
18·5—18·9	0·73—0·74	38	18·5—18·9	0·73—0·74	88
19·0—19·4	0·75—0·76	39	19·0—19·4	0·75—0·76	89
19·5—19·9	0·77—0·78	40	19·5—19·9	0·77—0·78	90
20·0—20·4	0·79—0·80	41	20·0—20·4	0·79—0·80	91
20·5—20·9	0·81—0·82	42	20·5—20·9	0·81—0·82	92
21·0—21·4	0·83—0·84	43	21·0—21·4	0·83—0·84	93
21·5—21·9	0·85—0·86	44	21·5—21·9	0·85—0·86	94
22·0—22·4	0·87—0·88	45	22·0—22·4	0·87—0·88	95
22·5—22·9	0·89—0·90	46	22·5—22·9	0·89—0·90	96
23·0—23·4	0·91—0·92	47	23·0—23·4	0·91—0·92	97
23·5—23·9	0·93—0·94	48	23·5—23·9	0·93—0·94	98
24·0—24·4	0·95—0·96	49	The barometric tendency cannot be reported.		99

Code XI.—*Sea Surface Temperature.*

Sea surface temperature to tenths of a degree Centigrade is coded by three figures, or, when necessary, by two figures preceded by zero. If the temperature is negative, the first of these three figures is 5.

For example:—

− 2·2° C. is coded as 522.
+ 1·0° C. ,, 010.
+ 15·6° C. ,, 156.

Table of Corrections for reducing Barometric Heights to 0° C. and to Sea Level.

NOTE.—The barometric reading should first be corrected for index error. This error may be neglected if it is less than 0·3 mm.

The + sign indicates that the correction is to be *added* to the barometric reading.

The − sign indicates that the correction is to be *subtracted.*

Sea Surface Temperature.

Temperature by the thermometer attached to the barometer.			−4° C. 24·8° F.	−2° C. 28·4° F.	0° C. 32° F.	+2° C. 35·6° F.	4° C. 39·2° F.	6° C. 42·8° F.	8° C. 46·4° F.	10° C 50° F.	12° C. 53·6° F.	14° C. 57·2° F.	16° C. 60·8° F.	18° C. 64·4° F.	20° C. 68° F.	22° C. 71·6° F.	24° C. 75·2° F.	26° C. 78·8° F.	28° C. 82·4° F.
			Corrections to be made.																
Height of barometer cistern above sea level: M'tres.	Ft.	In.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
0	0	0	+0·5	+0·3	0·0	−0·2	−0·5	−0·7	−1·0	−1·2	−1·5	−1·7	−2·0	−2·2	−2·5	−2·7	−3·0	−3·2	−3·5
1	3	3	+0·6	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·6	2·9	3·1	3·4
2	6	7	+0·8	0·5	0·3	0·0	0·3	0·5	0·7	1·0	1·2	1·5	1·7	2·0	2·2	2·5	2·8	3·0	3·2
3	9	10	+0·9	0·6	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·6	2·9	3·1
4	13	1	+1·0	0·8	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·2	1·5	1·7	2·0	2·2	2·5	2·8	3·0
5	16	5	+1·2	0·9	0·7	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·7	2·9
6	19	8	+1·3	1·0	0·8	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·8	2·0	2·3	2·6	2·8
7	22	0	+1·4	1·2	0·9	0·6	0·3	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·2	2·4	2·7
8	26	3	+1·5	1·3	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·8	2·1	2·3	2·6
9	29	6	+1·7	1·4	1·2	0·8	0·6	0·3	+0·1	0·2	0·4	0·6	0·9	1·1	1·4	1·6	2·0	2·2	2·5
10	32	10	+1·8	1·6	1·3	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·9	2·1	2·4
11	36	1	+1·9	1·7	1·4	1·1	0·8	0·6	0·3	+0·1	0·2	0·4	0·7	0·9	1·2	1·4	1·8	2·0	2·2
12	39	4	+2·0	1·8	1·5	1·2	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·1	1·3	1·6	1·9	2·1
13	42	8	+2·2	1·9	1·7	1·3	1·1	0·8	0·6	0·3	+0·1	0·2	0·4	0·7	0·9	1·2	1·5	1·8	2·0
14	45	11	+2·3	2·0	1·8	1·5	1·2	0·9	0·7	0·4	0·2	0·0	0·3	0·6	0·8	1·1	1·4	1·6	1·9
15	49	3	+2·4	2·2	1·9	1·6	1·4	1·1	0·8	0·6	0·3	+0·1	0·2	0·5	0·7	1·0	1·3	1·5	1·8
16	52	6	+2·5	2·3	2·0	1·7	1·5	1·2	0·9	0·7	0·4	0·2	0·1	0·4	0·6	0·9	1·2	1·4	1·6
17	55	9	+2·6	2·4	2·1	1·9	1·6	1·3	1·1	0·8	0·6	0·3	+0·1	0·3	0·5	0·8	1·0	1·3	1·5
18	59	1	+2·8	2·5	2·3	2·0	1·7	1·4	1·2	0·9	0·7	0·4	0·2	0·1	0·4	0·6	0·9	1·2	1·4
19	62	4	+2·9	2·6	2·4	2·1	1·9	1·5	1·3	1·0	0·8	0·6	0·3	0·0	0·3	0·5	0·8	1·0	1·3
20	65	7	+3·0	2·8	2·5	2·3	2·0	1·7	1·4	1·2	0·9	0·7	0·4	+0·1	0·2	0·4	0·7	0·9	1·2
21	68	11	+3·1	2·9	2·6	2·4	2·1	1·8	1·5	1·3	1·0	0·8	0·5	0·2	0·1	0·3	0·6	0·8	1·1
22	72	2	+3·3	3·0	2·8	2·5	2·2	1·9	1·7	1·4	1·2	0·9	0·6	0·3	+0·1	0·2	0·4	0·7	0·9
23	75	6	+3·4	3·1	2·9	2·6	2·4	2·1	1·8	1·5	1·3	1·0	0·8	0·4	0·2	0·1	0·3	0·6	0·8

Table for converting barometric readings in inches into millimetres.

Inches and Tenths	Hundredths of an Inch.									
	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.
	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
27·0	685·8	686·0	686·3	686·6	686·8	687·1	687·3	687·6	687·8	688·1
·1	688·3	688·6	688·8	689·1	689·3	689·6	689·9	690·1	690·4	690·6
·2	690·9	691·1	691·4	691·6	691·9	692·1	692·4	692·7	692·9	693·2
·3	693·4	693·7	693·9	694·2	694·4	694·7	694·9	695·2	695·4	695·7
·4	696·0	696·2	696·5	696·7	697·0	697·2	697·5	697·7	697·9	698·2
·5	698·5	698·7	699·0	699·3	699·5	699·8	700·1	700·3	700·5	700·8
·6	701·0	701·3	701·5	701·8	702·0	702·3	702·6	702·8	703·1	703·3
·7	703·6	703·8	704·1	704·3	704·6	704·8	705·1	705·4	705·6	705·9
·8	706·1	706·4	706·6	706·9	707·1	707·4	707·6	707·9	708·1	708·4
·9	708·7	708·9	709·2	709·4	709·7	709·9	710·2	710·4	710·7	710·9
28·0	711·2	711·4	711·7	712·0	712·2	712·5	712·7	713·0	713·2	713·5
·1	713·7	714·0	714·2	714·5	714·7	715·0	715·3	715·5	715·8	716·0
·2	716·3	716·5	716·8	717·1	717·3	717·5	717·8	718·0	718·3	718·6
·3	718·8	719·1	719·3	719·6	719·8	720·1	720·3	720·6	720·8	721·1
·4	721·4	721·6	721·9	722·1	722·4	722·6	722·9	723·1	723·4	723·6
·5	723·9	724·1	724·4	724·7	724·9	725·2	725·4	725·7	725·9	726·2
·6	726·4	726·7	726·9	727·2	727·4	727·7	728·0	728·2	728·5	728·7
·7	729·0	729·2	729·5	729·7	729·9	730·2	730·5	730·7	731·0	731·3
·8	731·5	731·8	732·0	732·3	732·5	732·8	733·0	733·3	733·5	733·8
·9	734·1	734·3	734·6	734·8	735·1	735·3	735·6	735·8	736·1	736·3
29·0	736·6	736·8	737·1	737·4	737·6	737·9	738·1	738·4	738·6	738·9
·1	739·1	739·4	739·6	739·9	740·1	740·4	740·7	740·9	741·2	741·4
·2	741·7	741·9	742·2	742·4	742·7	742·9	743·2	743·4	743·7	744·0
·3	744·2	744·5	744·7	745·0	745·2	745·5	745·7	745·9	746·2	746·5
·4	746·8	747·0	747·3	747·5	747·7	748·1	748·3	748·5	748·8	749·0
·5	749·3	749·5	749·8	750·1	750·3	750·6	750·8	751·1	751·3	751·6
·6	751·8	752·1	752·3	752·6	752·8	753·1	753·4	753·6	753·9	754·1
·7	754·4	754·6	754·8	755·1	755·4	755·6	755·9	756·1	756·4	756·7
·8	756·9	757·2	757·4	757·7	757·9	758·2	758·4	758·7	758·9	759·2
·9	759·5	759·7	760·0	760·2	760·5	760·7	761·0	761·2	761·5	761·7
30·0	762·0	762·2	762·5	762·8	763·0	763·3	763·5	763·8	764·0	764·3
·1	764·5	764·8	765·0	765·3	765·5	765·8	766·1	766·3	766·6	766·8
·2	767·1	767·3	767·6	767·8	768·1	768·3	768·6	768·8	769·1	769·4
·3	769·6	769·9	770·1	770·4	770·6	770·9	771·1	771·4	771·6	771·9
·4	772·2	772·4	772·7	772·9	773·2	773·4	773·7	773·9	774·2	774·4
·5	774·7	774·9	775·2	775·5	775·7	776·0	776·2	776·5	776·7	777·0
·6	777·2	777·5	777·7	778·0	778·2	778·5	778·8	779·0	779·3	779·5
·7	779·8	780·0	780·3	780·5	780·8	781·0	781·3	781·5	781·8	782·1
·8	782·3	782·6	782·8	783·1	783·3	783·6	783·8	784·1	784·3	784·6
·9	784·9	785·1	785·4	785·6	785·9	786·2	786·4	786·6	786·9	787·1
31·0	787·4	787·6	787·9	788·2	788·4	788·7	788·9	789·2	789·4	789·7
·1	789·9	790·2	790·4	790·7	790·9	791·2	791·5	791·7	792·0	792·2
·2	792·5	772·7	793·0	793·2	793·5	793·7	794·0	794·2	794·5	794·8
·3	795·1	795·3	795·5	795·8	796·0	796·3	796·5	796·8	797·0	797·3
·4	797·6	797·8	798·1	798·3	798·6	798·8	799·1	799·3	799·6	799·8

Table for converting Minutes to tenths of a Degree.

Minutes.	Tenths of a degree.
0–3	0
4–9	1
10–15	2
16–21	3
22–27	4
28–33	5
34–39	6
40–45	7
46–51	8
52–57	9
58–59	10

EXAMPLE.

Message containing Meteorological Information.

Ice:

—	First Message.	Coded as	Second Message.	Coded as
Date of observation	21	21	22	22
Time of observation	1 p.m.—4 p.m.	5	4 a.m.—7 a.m.	2
Nature of ice or derelict	Single iceberg	1	Field ice	5
Position of ice or derelict ...	Latitude 44° 35′	446	Latitude 42° 58′	430
	Longitude 43° 15′	432	Longitude 47° 3′	470

Weather:

—	First Message.	Coded as	Second Message.	Coded as
Date of observation	21	21	22	22
Position of ship	Latitude 45° 13′ Longitude 42° 5′	825	Latitude 43° 47′ Longitude 46° 33′	863
Direction and force of wind	E.S.E. 5	26	S.W. 2	55
Set and velocity of current	N.W. 2 m-h	82	S.S.E. 1 m-h.	39
Weather	Sky clear	0	Fog	8
Barometer	765·3 mm.	653	753·2 mm.	532
Air temperature	15·3° C.	61	9·8° C.	50
Barometric tendency	Rise ·8	02	Fall 2·7	56
Sea-surface temperature	1·4° C.	014	— ·7° C.	507

The Code of the above message sent to the Meteorological Office would thus be:—

Meteorology: Ice 21514, 46432: 22254, 30470: Weather; 21825, 26820, 65361, 02014: 22863, 55398, 53250, 56507.

ARTICLE II.

SAFETY SIGNAL.

The radiotelegraph stations which have to transmit to ships information involving safety of navigation and being of an urgent character (icebergs, derelicts, cyclones, typhoons, sudden changes

in the position or form of fixed obstructions or of land marks) shall make use of the following signal, called the safety signal, repeated at short intervals ten times at full power:

— — — (T T T)

In principle, all radiotelegraph stations receiving the safety signal, shall, if the transmission of messages by them would interfere with the receipt by any other station of the safety signal and the following safety message, keep silence, in order to allow all interested stations to receive that message. This does not apply to cases of distress.

The safety message shall be transmitted one minute after the safety signal has been sent out, and shall be repeated thereafter three times at intervals of ten minutes.

The Governments of the Contracting States will select the stations which are to send out to mariners safety information of an urgent character.

When the information in question has been sent out by stations performing the time service, it shall be again sent out after the transmission of the time signal and the weather report.

ARTICLE III.

MORSE CODE.

INTERNATIONAL SIGNALS.

These signals may be made at night or in thick weather, either by long and short flashes of light, or by long and short sound signals (whistles, fog-horns, etc.), or during the day by hand flags.

1.—URGENT AND IMPORTANT SIGNALS.

You are standing into danger ... ... · · —

I want assistance; remain by me ... ... · · · —

Have encountered ice ... ... · — —

Your lights are out (*or*, burning badly) ... · — — ·

The way is off my ship; you may feel your way past me ... ... · — ·

Stop (*or*, heave to); I have something important to communicate ... ... · — · ·

Am disabled; communicate with me ... · · — ·

2.—GENERAL SIGNALS.

Meaning.	Signal.	Equivalent Letters and How Made.	How Answered.
Preparative ...	- - - - - - - - - &c.	A succession of E's in one group	By the general answer T.
Answer ...	—	T (singly).	
Spelling ...	- - — - - - — -	F F in one group.	By the general answer T.
Use International Code of Signals.	— — — — — —	M M M in one group.	By the general answer T.
International Code Flag Sign.	— — — —	M M in one group.	
Break sign ...	- - - -	I I as separate letters.	
Stop	- - - - - -	I I I as separate letters.	
Finish of the message.	- - - — -	V E as one group.	- — - R. — - - D. As separate letters.
Erase sign ...	- - - - - &c.	A succession of E's as separate letters.	By a succession of E's as separate letters.
Annul ...	W W - — — - — —	W W as one group.	By W W as one group.
Repeat word after— (when a single word is required).	I M I - - — — - - W A - — — - — Followed by the word preceding the one required.	I M I as one group. W A as separate letters	By the general answer T.
Repeat all after— (if more than one word is required)	I M I - - — — - - A A - — - —	I M I as one group. A A as separate letters.	By the general answer T.
Repeat all— (if the whole message is to be repeated.)	I M I - - — — - - A L L - — - — - - - — - -	I M I as one group. A L L as separate letters.	By the general answer T.

Mr. A. S. Burleson

Postmaster-General,
United States of America.

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3.—NATIONALITY SIGNALS.

Meaning.	Signal.	Equivalent Letters and How Made.
American	— - — - — - -	C D as separate letters.
Argentine	— - — - — — -	C G ,, ,,
Austro-Hungarian ...	— - — - - - — -	C F ,, ,,
Belgian	— - - — - — -	D C ,, ,,
Brazilian	— - - -	D E ,, ,,
British	- - — -	F.
Bulgarian	— - - - - — -	D F as separate letters
Chilian	— - - — — -	D G ,, ,,
Chinese	- — - — -	E C ,, ,,
Colombian	- — - -	E D ,, ,,
Danish	- - - — -	E F ,, ,,
Dutch	- — — -	E G ,, ,,
French	-	E.
German	— — -	G.
Greek...	— — — — — - -	M M in one group followed by D.
Italian	— - — - -	C E as separate letters.
Japanese	— - — -	C.
Mexican	- - — - — - — -	F C as separate letters.
Norwegian	— — — — — - — -	M M in one group followed by C.
Peruvian	- - — - — - -	F D as separate letters.
Portuguese	- - — - -	F E ,, ,,
Russian	— - -	D.
Siamese	- - — - — — -	F G as separate letters.
Spanish	— — - — - — -	G C ,, ,,
Swedish	— — — — -	M M in one group followed by E.
Turkish	— — - — - -	G D as separate letters.
Uruguayan	— — - -	G E ,, ,,
Venezuelan	— — - - - — -	G F ,, ,,

4.—INSTRUCTIONS.

1. THE URGENT AND IMPORTANT SIGNALS may be made without the Preparative Signal being answered if it is supposed that the person addressed cannot reply, or in other special circumstances; but in this case a pause should be made between the Preparative Signal and the message.

2. THE SIGNAL - - — - - - — - (FF) is used previous to any letters which are intended to spell words.

3. THE SIGNAL — — — — — — (MMM) is used previous to any message sent by means of the International Code of Signals.

4. THE SIGNAL — — — — (MM) means the Code Flag of the International Code of Signals, and is used as indicated in the Code Book.

5. THE BREAK SIGN is used between the address of the receiver and the text of the message, and after the message if the name of the sender is to be signalled.

6. THE STOP is used, where necessary, in the text of the signal.

7. THE ERASE is used to cancel the last word or signal group, sent by mistake.

8. THE ANNUL is used to cancel *all* the message.

9. METHOD OF ANSWERING. Each word or signal group, when understood, is to be answered by one long flash — (T).

If a word or signal group is not answered, the sender is to repeat it until answered by a long flash.

At the end of the message, if understood, the receiver will make - — - — - - (RD).

The Erase and Annul signs are to be answered by their own signs.

10. THE NATIONALITY SIGNAL is made immediately after the answer to the Preparatory Signal has been received, to indicate the nationality of the vessel making the signal. It is answered by the nationality signal of the vessel receiving the message.

Safety Certificate.

Radiotelegraph installation :—

—	Class and numbers required by Articles 33 and 34 of the said Convention.	Actual class and numbers.
Class of ship :—	...	...
Number of Operators of the 1st Class ...	...	...
Number of „ „ 2nd „ ...	...	...
Number of Certificated Watchers ...	—	...

III. That in all other respects the ship complies with the requirements of the said Convention, so far as those requirements apply thereto.

This certificate is issued under the authority of the Government. It will remain in force until

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

(Signature)

Issued at the day of

LAWS AND REGULATIONS

ARGENTINE REPUBLIC

THE following Decree came into force on July 15th, 1913:—

ESTABLISHMENT AND ORGANISATION OF WIRELESS TELEGRAPH STATIONS.

1. The erection of wireless telegraph stations by the State is the attribute of—

(*a*) The Ministry of the Interior, when the object is to establish communication in any place for public use.

(*b*) The Ministry of Marine, when for strategical purposes they are erected on the sea coast, banks of navigable rivers, or on vessels of the Fleet.

(*c*) The Ministry of War, when, either fixed or portable, they are erected inland, and when they are for military purposes or for national defence.

2. Stations under the jurisdiction of the Ministries of War and Marine, which are selected by the Government, may be used for public service, shall be subject to the regulations in force and which may hereafter be issued in the matter.

3. It shall be the duty of the Directorate-General of Posts and Telegraphs to watch over and administer the public radiotelegraph service, in accordance with the powers conferred by the National Telegraph Law of 1875, and No. 4,408 of 1904, and the Decree of the Executive dated October 13th, 1908.

4. Authorisation to establish maritime wireless telegraph stations for public use will be granted by the Ministry of the Interior with the intervention of the Ministry of Marine.

5. Radiotelegraph experiments shall not be allowed in the territory of the nation without the permission of the Ministry of the Interior being first obtained. The Ministries of War and Marine shall in every case be informed when permits are granted. This requirement shall not be exacted in cases of official trials by the Departments of the Administration mentioned in Article 1.

6. Vessels of the National Mercantile Marine may instal stations of any radiotelegraph system on board, provided the latter allow of communication with those of the State, for which purpose application must be made to the Ministry of the Interior for a licence.

Coast stations opened in the country for the service of public corre-

spondence and those of vessels flying the national flag are hereby subjected to such provisions of the International Radiotelegraph and Telegraph Conventions as may concern them.

7. All stations must exchange traffic with the minimum of energy necessary to insure good communication.

Coast and ship stations must satisfy the following conditions :—

(*a*) The waves emitted shall be as pure and as little damped as possible.

In particular, the use of transmitting devices in which the waves emitted by discharging the aerial directly by sparks is forbidden except in cases of danger, or in cases of special stations, such as small boats in which the primary power does not exceed 50 watts.

(*b*) The apparatus must be capable of transmitting and receiving at a speed of not less than 20 words a minute, reckoning a word at the rate of five letters.

New installations which employ an energy of more than 50 watts shall be equipped in such a way as to obtain easily several ranges less than the normal range, the shortest of which must be less than approximately 15 nautical miles. Installations already established which used an energy of more than 50 watts shall be altered as far as possible in such a manner as to satisfy the foregoing requirements.

(*c*) Receiving apparatus must allow of receiving with the maximum possible amount of protection from disturbance transmissions with wave lengths specified in the present Regulations up to 600 metres.

(*d*) Stations intended exclusively for determining the position of ships must not operate over a radius greater than 30 nautical miles.

8. Independently of the general conditions specified in the foregoing Article (7), ship stations must also satisfy the following conditions :—

(*a*) The power transmitted to the radiotelegraphic apparatus, measured at the terminals of the generator of the station, must not exceed one kilowatt in normal circumstances.

(*b*) Subject to the provisions of Article 58, power exceeding one kilowatt may be employed if the ship is under the necessity of communicating at a distance of more than 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, the communication cannot be made without an increase of power.

9. Merchant vessels shall not be authorised to establish a radiotelegraphic service without a deposit being first made to the order of the Director-General of Posts and Telegraphs in the Bank of the Argentine

Nation as a guarantee for the exchange of its radiotelegraphic service, for an amount which shall be fixed according to circumstances, but which shall not be less than 100 dollars national currency (£8 14s. 3d.). Such deposit once made cannot be withdrawn until the interested parties give such notice that their steamships will no longer continue such service, as may be necessary for settling accounts; the itinerary of the vessels must be considered in this respect. Ship stations dependent on the administration of a country with which settlement of accounts is not carried out, shall be considered in the same category. In the latter case the deposit must be previously made by the agents of the company or the owners of the vessel.

10. When it is considered convenient to do so, the Directorate-General of Posts and Telegraphs may demand to be shown the certificate issued to a foreign vessel by its Government licensing the use of the radiotelegraph apparatus.

In the absence of such certificates the Department can satisfy itself that the wireless installation on board comply with the conditions imposed by the International Regulations.

11. Vessels of the National Mercantile Marine which have radiotelegraphic stations installed on board can exchange communications with coast stations. Merchant vessels which have no radiotelegraphic station can make use of radiograms by signalling by means of flags to the State semaphores, lighthouses, or pontoons having radiotelegraphic installations, provided that the companies, to which such ships belong, have one or more vessels equipped with radiotelegraphic stations duly authorised for service inscribed in the National Register of Shipping.

12. Foreign vessels flying the flag of a country which has not adhered to the International Convention can exchange radiotelegrams with the Argentine stations provided their respective Agents in the Republic may have requested permission to do so and have complied with the necessary formalities.

13. Merchant ships which are in the ports or channels giving access to ports, may not, under any pretext except in case of danger, use their radiotelegraphic apparatus. A fine of 100 dollars (£8 14s. 3d.) will be imposed for the first breach, and 200 dollars (£17 8s. 6d.) for every subsequent breach of this regulation, without prejudice to the licences being withdrawn from the ships, should such a course be found necessary. The Maritime Police can intervene in these cases to prevent the use of the apparatus.

14. Persons who instal or make use of radiotelegraphic apparatus without previously obtaining a licence, or who clandestinely or surreptitiously tap communications, shall be liable to the penalties established by the law relating to National Telegraphs, unless in the cases where greater responsibility is involved, such as where the personnel of the Army or the Navy is concerned, if considered necessary, without prejudice, to the immediate demolition of the works.

15. The work of the radiotelegraphic stations, irrespective of the object for which they have been installed, shall be organised in such a manner as not to disturb the work of other similar stations. In the International Service, as regards the frontier stations not dealt with by the International Convention, the agreements and necessary service regulations drawn up between the departments of the Ministries interested and the respective foreign States shall be adopted.

The Ministries of War and Marine may combine the services of their stations for strategical purposes.

If stations are connected exclusively for official service, the cost shall be borne by the Ministry on which they depend.

16. The respective dependencies of the Ministries of War and Marine shall furnish the Directorate-General of Posts and Telegraphs with the reports which it may require regarding the public radiotelegraph service, and they are authorised to deal directly with that Department for such purpose.

17. The Directorate-General of Posts and Telegraphs shall intervene in matters connected with the international service, and is charged with the duty of seeing that the Convention and its regulations are complied with; it must deal with the Berne Bureau and other foreign Administrations when requesting and supplying the same concerning the radiotelegraphic services of the country in the same manner as is at present done as regards telegraph service.

18 to 31 (inclusive).—These articles relate to wave lengths, intercommunication, operators' certificates, the furnishing of information for the Berne list by the Directorate-General of Posts and Telegraphs, and other matters as required by the International Convention. Article 27 requires stations which are classified in the first two categories mentioned in Article 32, to have, independently of the power produced by the ships' propelling machinery, a reserve of electric energy, which may be storage batteries. The auxiliary power must be able to be utilised for at least six hours and have a minimum range of at least 80 nautical miles for ships in the first category and 50 nautical miles for those in the second category.

Ship Stations.

32. Ship stations shall be classified within the following categories:—

(1st) Stations of permanent service: for ocean-going steamships with a capacity to carry fifty or more passengers.

(2nd) Stations with limited service: for all kinds of steamships which carry passengers and are not included in the foregoing conditions.

(3rd) Stations without any fixed hours of service: for vessels which do not carry passengers.

When navigating the following must always be on the watch:—

(1st) The stations included in the first category.

(2nd) Those included in the second category during the hours appointed for their service, and after those hours during the first ten minutes of each hour.

Stations included in the third category are not bound to any regular service as regards being on the watch.

The category in which the vessel is included must be mentioned in the licences issued.

33 to 65 (inclusive).—These articles cover the drawing up and handing in of radiotelegrams, tariff, counting of words and collection of charges, signals, and order of transmission, delivery of radio-telegrams, etc., which are in accordance with the International Convention.

Accounts.

66. For the purpose of accounting coast stations shall be considered as the destination of radiotelegrams passing over the lines of the national telegraph system to be forwarded to ships' stations, and as stations of origin of radiotelegrams coming from ships' stations to be transmitted over the lines of the National telegraph system.

67. Merchant vessels on the National Register may interchange radiotelegrams between one another and with foreign ships.

The accounts for this interchange of service shall be settled directly as between the companies working those stations, the station of origin being debited by the station of destination.

68. Shipping companies or masters of vessels must balance their accounts monthly in the Administration of Posts and Telegraphs of the nation in accordance with the form of liquidation which that Department will draw up and prepare for the purpose.

69. The amount of charges received in the public service by the radiotelegraph stations of the State shall be paid every month to the Administration of Posts and Telegraphs. The form, filled in with the necessary information for keeping the accounts respecting radiotelegrams interchanged, together with the originals of the messages sent, retransmitted and received, shall be sent every month to the Administrative Section of the Directorate-General of Posts and Telegraphs.

70. The provisions of the two preceding articles shall apply to the personnel of the Army in the radiotelegraph stations belonging to the Ministry of War; in this case the officers of the Administration of the corps shall be charged with the duty of collecting and rendering accounts to the Directorate-General of Posts and Telegraphs of the Nation.

71. Coast and ships' charges shall be settled by the Directorate-General of Posts and Telegraphs with foreign administrations, and the

companies to which the stations belong through which the interchange of radiotelegrams has been made in accordance with Article XIII. of the International Radiotelegraph Regulations.

MISCELLANEOUS PROVISIONS.

72. The Telegraph Department of the Nation shall forward over its lines the service telegrams sent by the Heads of the Inspection of Communications of the Ministries of War and Marine and by superintendents of the radiotelegraph stations of the State which are opened to public service, providing that necessity calls for such action.

73. The Ministry of Marine may authorise the coast stations to give maritime information agencies data and details respecting maritime disasters and wrecks or other information which may be of general interest to navigators.

74. The respective offices of the Ministries of War and Marine, in agreement with the Directorate-General of Posts and Telegraphs, shall determine the character of the radiotelegraph stations to be opened to service.

75. The offices dependent on the Ministries of War and Marine shall advise the Directorate-General of Posts and Telegraphs, when called upon to do so, for the purpose of carrying out these Regulations.

76. Coast and ships' stations are bound to re-transmit radiotelegrams when communication cannot be established directly between the stations of origin and destination.

In such circumstances they must not make more than two re-transmissions.

In the case of radiotelegrams intended for *terra firma* use may only be made of re-transmission to reach the nearest coast station.

This re-transmission shall be made when the intermediate station which receives it in transit is in a position to send it on.

77. Coast radiotelegraph stations must always accept with absolute priority calls for assistance from vessels in distress, and shall reply in the same way to those calls and communicate them with the indication "urgent" to the lines of the National Telegraph System or to addressees.

78. The provisions of the International Telegraph Regulations are applicable by analogy to the radiotelegraph correspondence in so far as they are not contrary to those of the International Radiotelegraph Regulations.

A LAW has been issued in accordance with which all ships entering or leaving Argentina ports with 50 or more persons on board must possess a wireless telegraph installation, under the charge of a competent operator. For use on river steamers the wireless must have a range of not less than 200 kilos. (about 125 miles) and for sea-going vessels a range of at least 500 kilos. (about 310 miles). Vessels not complying with the regulations will not be cleared.

AUSTRALIA

THE Postmaster-General's Department controls commercial wireless telegraphy in the Commonwealth. The first Act was passed in 1905, and is as follows:—

No. 8 of 1905.

1. *Short Title.*—This Act may be cited as the Wireless Telegraphy Act, 1905.

2. *Interpretation.*—In this Act—

"Australia" includes the territorial waters of the Commonwealth and any territory of the Commonwealth;

"Wireless Telegraphy" includes all systems of transmitting and receiving telegraphic messages by means of electricity without a continuous metallic connection between the transmitter and the receiver.

3. *Exemption of Ships of War.*—This Act shall not apply to ships belonging to the King's Navy.

4. *Exclusive Privileges of Postmaster-General.*—The Postmaster-General shall have the exclusive privilege of establishing, erecting, maintaining, and using stations and appliances for the purpose of—

(*a*) transmitting messages by wireless telegraphy within Australia, and receiving messages so transmitted, and

(*b*) transmitting messages by wireless telegraphy from Australia to any place or ship outside Australia, and

(*c*) receiving in Australia messages transmitted by wireless telegraphy from any place or ship outside Australia.

5. *Licences.*—Licences to establish, erect, maintain, or use stations and appliances for the purpose of transmitting or receiving messages by means of wireless telegraphy may be granted by the Postmaster-General for such terms and on such conditions and on payment of such fees as are prescribed.

6. *Penalty for Breach of Act.*—(1) Except as authorised by or under this Act, no person shall—

(*a*) establish, erect, maintain, or use any station or appliance for the purpose of transmitting or receiving messages by means of wireless telegraphy; or

(*b*) transmit or receive messages by wireless telegraphy.

Penalty: Five hundred pounds, or imprisonment with or without hard labour for a term not exceeding Five years.

Ships Fitted with Apparatus for Wireless Telegraphy.—(2) Subsection (1) of this section shall not, except as prescribed, extend to appliances maintained on any ship, arriving from any place beyond Australia, for the purpose of enabling messages to be transmitted from

or received on that ship by means of wireless telegraphy, but all such appliances shall, while the ship is within Australia—

(*a*) be subject to the control of the Postmaster-General; and

(*b*) only be used by his authority or as authorised by the regulations.

Penalty: Five hundred pounds.

7. *Forfeiture of Appliances Unlawfully Erected.*—All appliances erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, shall be forfeited to the King for the use of the Commonwealth.

8. *Search Warrants for Appliances Unlawfully Erected.*—(1) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that any appliance is established, erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, he may grant a search warrant to any person.

(2) A search warrant under this section shall authorise the person to whom it is addressed to break and enter any place or ship, where the appliance is or is supposed to be, either by day or by night, and to seize all appliances which appear to him to be used or intended to be used for transmitting or receiving messages by means of wireless telegraphy.

9. *Proceedings in Respect of Offences.*—(1) Proceedings for any offence against this Act may be instituted in any Court of Summary Jurisdiction, and any person proceeded against under this section may be dealt with summarily or may be committed for trial.

(2) The Court in dealing summarily with any accused person under this section may, if he is found guilty of any offence against this Act, punish him by imprisonment with or without hard labour for any period not exceeding six months, or by a penalty not exceeding Fifty pounds.

10. *Regulations.*—The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters which by this Act are required or permitted to be prescribed or which are necessary or convenient to be prescribed for carrying out or giving effect to this Act.

Statutory Rules.

No. 216, 1911.

In 1911, the Governor-General, acting with the advice of the Federal Executive Council, issued regulations under the Act of 1905, and these came into force on January 13th, 1912.

In these regulations, "Australian ship" means a ship registered in Australia; "British ship" means a British ship other than an

Australian ship; "Foreign ship" means a ship other than an Australian ship or a British ship; "Harbour" includes any harbour properly so called, whether natural or artificial, or any estuary, navigable river, pier, jetty, or other work in or at which a ship can obtain shelter, or ship or unship goods or passengers; "Land Station" means a station, not being a ship station, for the transmission and receipt of messages by means of wireless telegraphy, and includes an experimental station; "Ship Station" means a ship (not permanently moored) having installed thereon appliances for the transmission and receipt of messages by means of wireless telegraphy; "Territorial Waters" means the territorial waters of the Commonwealth and those of any territory of the Commonwealth, and includes harbours; "The Act" means the *Wireless Telegraphy Act*, 1905.

General Licences.—Licences under Section 5 of the Act may be (*a*) General Licences, or (*b*) Experimental Licences.

4. *General Licences.*—(1) A General Licence shall be granted only in respect of ship stations on Australian ships.

(2) Any number of ships belonging to the same company or person may be included in a General Licence.

(3) A General Licence may be in accordance with the form in the Schedule, and shall include the terms and conditions set out in that form.

(4) A General Licence shall be for a period of one year from the date thereof, but may be renewed from time to time.

5. *Experimental Licences.*—(1) An Experimental Licence may be granted in respect of land stations only.

(2) An Experimental Licence shall be in such form and, subject to these regulations, shall contain such terms and conditions as the Postmaster-General thinks fit to include therein.

(3) An Experimental Licence shall remain in force until revoked, or until surrendered by the licensee, but shall be revocable at will by the Postmaster-General.

(4) The wireless telegraphy appliances included in an Experimental Licence shall be used only for experimental purposes, and so as not to interfere with the working of any land station or ship station, and the licensee shall in working the appliances obey all directions issued by the Postmaster-General.

(5) Two land stations may be included in any one Experimental Licence.

6. *Supplementary Licence.*—(1) The Postmaster-General may grant to the holder of a General Licence a Supplementary Licence in respect of any ship belonging to him and not included in the General Licence.

(2) A Supplementary Licence shall be in such form as the Postmaster-General thinks fit, and shall be deemed to be incorporated with the General Licence, and the General Licence shall apply to each ship included in the Supplementary Licence to the same extent as if the ship had been included in the General Licence.

7. *Fees for Licences.*—The fees for licences shall be as follows—

For a General Licence for ship stations or for any renewal thereof—Five shillings for each ship included in the licence.

For a Supplementary Licence for ship stations or for any renewal thereof—Five shillings for each ship included in the licence.

For an Experimental Station—One pound one shilling for each licence for the first year, and seven shillings and sixpence for each succeeding year.

8. *Application for a General Licence.*—(1) An application for a General Licence must be in writing, and must set out the following particulars: (*a*) the names of the different ships to be included therein; (*b*) the ports in Australia at which the ships are registered; and (*c*) the system of wireless telegraphy to be used on the ships.

(2) Before granting the licence the Postmaster-General may require the applicant to furnish such additional particulars as he thinks necessary.

9. *Condition as to Syntony, etc.*—Before any General Licence is granted, the applicant must satisfy the Postmaster-General that the wireless telegraphy apparatus or appliances to be worked in pursuance of the licence complies with the regulations for the time being in force governing syntony and wave length.

10. *Licences to be in Duplicate.*—(1) Every licence shall be made out in duplicate, and one part shall be issued to the Licensee and the other retained in the Department of the Postmaster-General.

(2) Before the licence is issued to the applicant he shall execute the part of the licence to be retained in the Department.

11. *Renewal of a Licence.*—(1) A General Licence or Supplementary Licence may be renewed by writing thereon a memorandum stating the period for which it is renewed.

(2) The memorandum of renewal must be signed by the Postmaster-General or by some officer authorized by him.

(3) The renewal may be made at any time within one month before or one month after the expiry of the licence.

(4) The memorandum is to be written on both parts of the licence.

12. *Revocation of Licence.*—The Postmaster-General may, by notice in writing, revoke and determine any licence, as to all or any of the ship stations included therein, on the ground of the licensee having failed to comply with any regulation for the time being in force under the *Wireless Telegraphy Act* 1905, or on any other ground specified in the licence.

13. *Powers of Inspection.*—The Postmaster-General or any Deputy Postmaster-General or any person thereto authorised in writing by the Postmaster-General or by a Deputy Postmaster-General may at all reasonable times enter upon any ship station or land station on which wireless telegraphy appliances are installed, or are in course of being installed, in pursuance of a licence, and may inspect such appliances and the working and user thereof.

14. *Communications between Ship and Land Stations.*—When communications are made by means of wireless telegraphy between a ship (whether British, Foreign, or Australian) in territorial waters and a wireless telegraph station on land, the rules in force for the working of wireless telegraphy at that station shall be observed.

15. *Application of the Radiotelegraphic Convention and Regulations.*—The provisions of the Radiotelegraphic Convention and the Service Regulations for the time being in force thereunder, so far as such Convention and Regulations are applicable, shall apply to all wireless telegraphy installations available for the transmission or receipt of private messages, whether installed by the Commonwealth or under Licence, and whether at ship stations or land stations, and every Licensee shall comply therewith.

16. *Appliances to be Worked so as to Avoid Interference with other Appliances.*—(1) The wireless telegraphy appliances on board any ship (whether an Australian ship, a British ship, or a foreign ship) in territorial waters shall be worked in such a way as not to interrupt or interfere with—

(*a*) Naval or Military signalling; or

(*b*) the transmission of messages between other wireless telegraph stations.

(2) In this regulation Naval or Military signalling includes signalling or communicating, by means of any system of wireless telegraphy, by the King's Imperial or Colonial Naval or Military Forces.

17. *Appliances not to be Worked while Ship in Harbour.*—Except by permission of the Postmaster-General, the wireless telegraphy appliances on board any Australian ship, British ship, or foreign ship (other than a ship of war) shall not be worked or used whilst the ship is in any harbour in Australia or any territory of the Commonwealth.

18. *Application of Defence Regulations to Foreign Ships of War in Harbours.*—The use of wireless telegraphy appliances on board any foreign ship of war while in any harbour in Australia or any territory of the Commonwealth shall be subject to such rules (whether prohibitive or regulative) as the Governor-General may think fit to make.

19. *Powers of Governor-General in Emergencies.*—If at any time, in the opinion of the Governor-General, an emergency has arisen in which it is expedient that the Commonwealth Government should have control over the transmission of all messages by wireless telegraphy, he

may by notice in the *Gazette* prohibit for such period as he thinks necessary the use of wireless telegraphy on board foreign ships in territorial waters.

20. *Control of Appliances in Emergencies.*—(1) In case of emergency, any officer in command of any ship of war of His Majesty's Navy (whether Imperial or Colonial), or any officer in command of any part of the Defence Force, may—

(*a*) take possession of any wireless telegraphy appliances installed on any ship in pursuance of a licence, or installed in pursuance of any experimental licence, and use such appliances for the King's service; or

(*b*) place any person in control of any such appliances; or

(*c*) direct the licensee or person in charge of such appliances to submit to him all or any messages tendered for transmission or received by means of such appliances; or

(*d*) stop or delay or direct the licensee or person in charge of such appliances to stop or delay the transmission or delivery of any such messages or to deliver them to him; or

(*e*) direct the licensee or person in charge of such appliances to comply with all such directions as he thinks fit to give with reference to the transmission or receipt of messages by means of such appliances.

(2) Every licensee and every person in charge of any wireless telegraphy appliances installed in pursuance of a licence or experimental licence shall comply with this regulation, and all directions issued in pursuance thereof.

(3) Reasonable compensation shall be payable to the licensee for any damage to the appliances arising in consequence of the exercise of the powers conferred by this regulation.

21. *Use of Wireless Telegraphy for Naval or Military Purposes.*—These regulations shall not prevent the use, without licence, by the naval or military authorities of wireless telegraphy for naval or military purposes: Provided that in time of peace each wireless telegraphy installation (other than a mere temporary installation) to be used shall be authorised in writing by the Minister of Defence and notice in writing of the installation shall be sent to the Postmaster-General.

The form of licence set out in the schedule to the above regulations is similar to that employed by the British Post Office. It is laid down in Rule I. that the

"Apparatus shall be deemed to be 'syntonised' when the transmitting apparatus is so adjusted as to communicate with a receiver which has a corresponding adjustment, and to produce as little effect as possible on a receiver not having a corresponding adjustment. The aerial antenna must be continuous and without a break when in the transmitting condition. If two

waves are emitted, neither may differ from the normal wave of the station by more than 3 per cent., provided that in the case of stations using 5 kilowatts or over this variation shall not exceed 2 per cent."

Navigation Act

THE Commonwealth Parliament have just passed a new Navigation Act, which contains a clause making it compulsory for ships trading in Australian waters to be equipped with apparatus for wireless telegraphy. This matter is dealt with in Section 236 of the Act, and the text of the section given below is as under :—

EXTRACT FROM NEW NAVIGATION ACT, 1912.

DIVISION VI.—SIGNALS OF DISTRESS.

233 ... ...

234 ... ...

235 ... .

236 (1) Except as prescribed, every foreign-going ship, Australian trade ship, or ship engaged in the coasting trade, carrying fifty or more persons, including passengers and crew, shall before going to sea from any port in Australia be equipped with an efficient apparatus for wireless communication in good working order in charge of one or more persons holding prescribed certificates of skill in the use of such apparatus.

(2) For the purposes of this section apparatus for wireless communication shall not be deemed to be efficient unless :—

(*a*) It is capable of transmitting and receiving messages over a distance of at least one hundred miles, day and night.

(*b*) The person controlling the operator undertakes in writing to the Minister to exchange, and does, in fact, exchange, as far as may be physically practicable (of which the master shall be the judge) messages with shore or ship stations using similar or other systems of wireless communication ; and

(*c*) There is provided, in connection with the apparatus, and ready for use whenever from any cause the ordinary supply of electrical power is not available, a battery of accumulators of such capacity as to insure for a period of at least six hours communication of the efficiency prescribed in paragraph (*a*) of this sub-section.

(2a) The equipment shall, if so prescribed, include a silent chamber for the receipt of messages.

(3) The master of a ship required by this section or the regulations to be equipped with wireless telegraphy apparatus shall not take her to sea, and the owner of a ship required to be so equipped shall not permit her to go to sea, unless the requirements of this section have been complied with.

PENALTY : One Thousand Pounds

(4) The regulations may prescribe the times and hours during which an operator shall be in attendance on the apparatus, ready to receive or transmit messages.

(5) Except as otherwise prescribed, the provisions of this section shall not apply to ships plying exclusively between ports in Australia less than two hundred miles apart.

In addition to the clauses quoted above, the following new sub-clause was to be proposed by the Minister for Defence in the Senate :—

"The Governor-General may make regulations in accordance with the provisions of any International Convention to which the United Kingdom is a party relating to the use of Wireless Telegraphy on ships, and such regulations may be in addition to or in substitution either wholly or in part for the provisions of this section."

AUSTRIA

THE following Decree of the Ministry of Commerce, dated 7th January, 1910, is concerned with wireless telegraph stations in the Austrian Empire, on board Austrian ships, and on ships of foreign nationality in Austrian territorial waters :—

(1) In accordance with a High Decree of Parliament of January 16th, 1847, and the Decree of the Ministry of Commerce, dated April 28th, 1905, the erection and working of Wireless Telegraph stations in the Austrian Empire and on Austrian ships is a State concession, to acquire which a written application (liable to Stamp Duty), containing a description of the station and a diagram of connections, must be submitted.

(2) The choice of system, apparatus, and fixtures, as well as the establishment of coast and land rates within the limits of the Wireless Telegraph agreement of 1909, and the supplemental regulations are the prerogative of the Ministry of Commerce.

(3) The general regulations for Wireless Telegraph stations on board ships are shown below.

(4) Wireless Telegraph stations on board ships must fulfil the following conditions :—

(*a*) They must be of equal technical efficiency to systems other than that adopted in the stations, and they must be able to inter-communicate with other systems.

(*b*) The system adopted must be one of "syntonisation."

(*c*) The speed of transmission and reception must not, under normal circumstances, be less than twelve words (each of five letters) per minute.

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(*d*) The power possessed by the apparatus must not exceed, in normal conditions, 1 kilowatt. A greater power can be used when the ship is under an obligation to exchange messages at a longer distance than 300 kilometres from the nearest coast station, or when the transmission can only be effected by means of a higher power than specified.

(5) The working of Wireless Telegraph stations on board foreign ships in Austrian territorial waters is dependent upon the previous grant of a State concession. This regulation does not apply to war-ships or ships in distress. If a foreign vessel employs its Wireless Telegraph station without authorisation, the State authorities may take steps to prevent the working of the station in Austrian territorial waters.

Document of Concession.

THE Ministry of Commerce hereby grants to .... the concession for the installation and working of a wireless telegraph ship station on board the s.s. .... and reserves to itself the right to cancel same at any time. The concession is granted on the following conditions:—

(1) The Wireless Telegraph station must be erected according to the description in the application and according to the diagram of connections.

Supplemental changes in the technical installation which would have an effect upon the transmitting and receiving speed of the station cannot be undertaken without the consent of the Ministry of Commerce.

(2) The concessionnaire must pay an annual recognition fee of 20 Kronen for the station.

(3) The Telegraph Directorate is entitled to empower their officials to examine the station and to control the working of the same.

Opportunity must be given to officials of the Austrian Navy, on their request, to make themselves acquainted with the working of the station apparatus.

Collusion in order to keep back details of the condition of the station from the official authorities is inadmissible.

(4) The Telegraph Directorate reserves to itself the right of using the station at any time, completely and absolutely, or for a definite kind of correspondence, and this they may do without giving their reasons, or without the concessionnaire being able to claim any indemnity.

(5) In case of war and mobilisation the station must be closed. The commander of the ship must superintend the closing and make himself responsible for it.

The control over the supervision of this measure is confined to the military authorities.

(6) Only Austrian subjects can be employed as telegraph operators, and they must be able to show a testimonial to the effect that they have successfully passed the special examination of the Telegraph Directorate.

Wireless telegraph operators on board ship must be provided with a sea service book, they must be enrolled in the muster, and must be subject to the ship's discipline.

In case of the cancelling of the above-mentioned testimonial by the State Telegraph Directorate, a telegraph operator must be dismissed immediately.

Every change of operator must without delay be notified to the marine authorities in Trieste.

(7) The concessionnaire must allow to third persons the services of the station on payment by them of the normal charges.

(8) The station charge amounts to . . . a word. The lowest telegram amounts to . . . Kronen. The charge belongs to the underwriter.

(9) The station must exchange news with all coast stations, and with all other ship stations without prejudice as to the system of wireless telegraphy used by these stations.

(10) As regards the working of the station and the scale of the tariff, the regulations of the International Radio Telegraph Convention and its supplemental regulations must be observed, in the same manner as all measures published by the Telegraph Directorate.

The call signal of the station is established as . . . .

THE following is a copy of the Decree of the Minister of Commerce of November 8th, 1910, concerning the installation of wireless stations on passenger ships engaged in the carrying service abroad :—

Austrian vessels of the merchant service making voyages from Austrian ports and carrying passengers beyond Gibraltar or Aden must be fitted with wireless telegraph apparatus.

With regard to the fitting, working, and staff of such wireless stations, the conditions of the Decree of the Ministry of Commerce dated January 7th, 1910, must be complied with. Such stations must be capable of exchanging telegrams at a distance of 100 nautical miles, and above all must be of use, at the request of the Captain, for rescue purposes and for the safety of the vessel by communication with coast stations or with the stations of other ships without distinction of system.

The Royal Imperial Masters of Ports as well as Consuls are

authorised to forbid the carrying of passengers on any ships passing beyond Gibraltar and (or) Aden not so fitted.

This decree will come into force one year after notice of same has been published.

THE following Regulation of the Ministry of Commerce, dated March 1st, 1912, concerns the erection of a wireless telegraphy inspectorate in Trieste, and the erection and regulation of wireless telegraphy offices on Austrian vessels.

(1) In accordance with the High Decree of 15th February, 1912, a Royal Wireless Telegraphy Inspectorate has been created, which is immediately subordinate to the Ministry of Commerce. On and after April, 1912, this department shall control the Wireless Telegraph offices on board Austrian ships, private Wireless Telegraph offices on Austrian ships and foreign ships in Austrian territorial waters.

Regulations.

The following normal Regulations governing the installation and working of wireless telegraph offices on board Austrian ships came into force on April 1st, 1912:—

(1) Wireless Telegraph offices on board ships under the State direction shall carry the sign "Kk Bordtelegraphamt" (Royal Telegraphy Office on Board Ship), together with the name of the vessel.

(2) The owner of a vessel who requires a Wireless Telegraph office must apply to the Ministry of Commerce, and must give the following particulars:—

(*a*) The name of the ship and the time and date when the installation is required to be erected.

(*b*) The routes on which the ship will be principally engaged.

(*c*) The accommodation for first and second-class passengers on board.

(3) The Ministry of Commerce must, within a period of two months, inform any applicant for a Wireless Telegraph installation on board ship whether such an installation will be granted, and, if so, upon what terms.

Provided the vessel on which it is proposed to instal a Wireless Telegraph office comes within the scope of the Decree of the Ministry of Commerce, dated November, 1910 (concerning the equipment for Wireless Telegraphy of long-voyage passenger ships) the Ministry of Commerce must grant any application made in accordance with these regulations.

In cases where the Ministry declines to grant an installation, it is not called upon to state any reasons for its refusal. A written agreement is in all cases drawn up between the State Department and the owner of the vessel when an installation is granted.

In the event of any change in the regulations, a new agreement must be made.

(4) The Wireless Telegraph office shall be installed as near as possible to the date required by the shipowner, provided the application sent has duly satisfied the conditions laid down in Regulation 2. The period during which the installation is granted is usually six months.

The State department shall bear the entire cost of the fitting and furnishing of the Wireless Telegraph office, which is to remain the property of the State. The department shall undertake to maintain the office in a state of efficiency and to supervise the working of the installation through its own servants.

(5) The shipowner shall be responsible for the cost of all arrangements on board, services of the ship's *personnel*, materials and plant necessary for the proper installation and working of the Wireless Telegraph office, as well as the necessary electric power.

The shipowner's obligations with regard to these arrangements are set forth in detail in the written agreement referred to in Regulation 3.

The shipowner shall be required to provide adequate facilities for the telegraphists on board, to enable them to carry out their duties in an efficient manner; and the telegraphists must be made acquainted with the course and speed of the ship, soundings, and distances from foreign stations, as well as meteorological data.

6. The shipowner must pay the salaries due to the telegraphists for each voyage, which amounts thus paid will be refunded by the State, who will inform the owner, before the departure of the vessel, the amount of salary due to the telegraphists and the dates when the salaries become due.

The owner of the ship must make suitable provision for the safety of the telegraphists on board.

The owner must, at his own cost, carry out the following duties :—

(*a*) Carry telegraphists of the Royal Austrian Navy between Pola and Trieste when ordered to transfer them to or from the Wireless Telegraph Inspectorate at Trieste.

(*b*) Transfer the ship's telegraphists between the port and the ship which is being equipped with a Wireless Telegraph office, or between two ships, and provide for the maintenance of the telegraphists during the transfer.

(*c*) First-class travelling expenses and maintenance of the chief officials of the Royal Telegraph Department shall be provided when the officers are proceeding to take up their duties. Second-class travelling expenses shall be provided for officers of lower rank.

(7) The shipowner must contribute to the State Department an annual sum for the cost of the Wireless Telegraph office on board.

In the case of ships which come under the decree of the Ministry of Commerce dated November, 1910, the amount which the shipowner must contribute is from Kr. 2,200 to 2,500 (£1,100 to £1,250)—the amount depending upon whether the apparatus is of the first or second-class type. The Ministry of Commerce will decide under which class the apparatus comes. The annual amount is payable in advance, in instalments, which become due on the first day of the months January, April, July, and October. The liability of the owner of the vessel becomes due on the date when the Wireless Telegraph office on board commences operations, and ceases on the date of the closing of the office; but in any case not before the expiration of the term of notice.

If the ship should be lost, the obligation to contribute ceases on the date of the loss, and when this is not known, the obligation is dated from the last date on which the ship was heard.

When a vessel has received through its Wireless Telegraph office distress messages from other ships, and has thus saved or helped to save another ship, the owner must pay to the State Department 3 per cent. of the net sum received by him for salvage.

(8) Service messages to and from the owner of the ship are dealt with at ordinary rates; "shipowner telegrams" which are wireless telegrams transmitted by the captain of the ship to the owner, or to the managing officials or agents, and which deal with the crew, passengers, cargo condition, voyage, conduct, or damage of the ship, are not transmitted in the interests of a third person.

"Ship Service Telegrams" are wireless telegrams exchanged by the captains of ships under the same ownership. Both classes of telegrams must be composed by the senders, and code words must be used as far as possible. A copy of the code must be deposited on board ships that have to transmit shipowner and ship service telegrams, and likewise in the office of the department. Such telegrams must be written by the sender on a form having a detachable receipt coupon provided for the purpose. They are only transmitted when the receipt coupon has been impressed with the ship's stamp, and this stamp must agree with the stamp which is deposited by the commander of the vessel in the wireless telegraph office on board.

(9) The coast and land charges for shipowner telegrams are deferred and are fixed on the basis of the receipt coupon in the wireless office on board. These charges must be checked immediately after the arrival of the ship in her own port against the amount of the receipt in the wireless telegraph office on board.

The charges for private telegrams may be collected in cash by the officer in charge of the wireless telegraph office, at the time of the despatch of the telegram, or they may be placed to credit.

(10) Telegraph operators on board are subject to the general disci-

pline of the ship, and to the instructions of the captain or his representatives. They must not, however, be called upon to participate in any of the ordinary business of the ship.

Free access to the premises of the telegraph office is allowed to the captain or to his representatives. Other members of the crew may have access to these premises only for the purpose of executing the duties mentioned in Regulation 5.

A member of the crew must be sufficiently competent to take the place of the operator in case of necessity, and before the beginning of the voyage the person so appointed must be sworn to secrecy in the usual way.

(11) The State shall provide a Wireless Telegraph office on board ship when it deems it necessary for a definite or indefinite period, and in this case the owner has no claim to indemnity.

In the case of mobilisation or war the embargo on the Wireless Telegraph office of a ship can be ordered by the Royal Austrian Navy or by a Royal Austrian Consulate.

The captain of a ship is responsible for the closing of a telegraph office when such an order proceeds from the authorities mentioned.

(12) The State may at any time create a Wireless Telegraph office on a ship not limited to the decree referred to in Regulation 3. The owner of the ship must receive not less than six months' notice of the intention to create such an office; but, where circumstances warrant it, this period of notice shall not be observed.

The owner must give six months' notice in writing of his intention to terminate the agreement referred to in Regulation 3, and in the case of the sale of the ship three months' notice.

After the expiration of the notice the Wireless Telegraph office will be dismantled (except in the case of the ship sold abroad), but the dismantling shall take place only when the ship is in an Austrian port.

In the event of the dismantling of the office taking place in a port other than that of Trieste, the shipowner must pay for the technical dismantling and material belonging to the State, and he must despatch the apparatus to Trieste at his own cost, and pay the fares of the telegraph operators to the last-named port.

Temporary Service Regulations for Wireless Telegraphists.

A.—General.

1. In the Wireless Telegraph service of the Government Post and Telegraph Organisation, and, outside the Royal Naval Reserve, State employees under the title of "Funkentelegraphisten" (wireless telegraphists) will be employed.

The appointment of wireless operators will only take place in case of a lack of Royal Naval Reserves.

The conditions of service of wireless operators is subject to the

following regulations, which, however, do not in any way affect discipline on board ship either of Captains, Port Officials, or Consuls.

B.—APPOINTMENT.

The conditions for the appointment of wireless operators are as under :—

1. Proof of Austrian citizenship.
2. Freedom from any conviction in a criminal court.
3. Age limit, between 18 and 40 years.
4. Proof of bodily fitness and general capability for the service.
5. Proofs of the necessary knowledge of languages for the special conditions of service.
6. Proof of capability to obtain a ship's telegraphist's certificate in case one year has expired since the issue of the certificate held by the applicant or since the last practical work done by him. The applicant has to prove that he has sufficient practice to enable him to carry on the service in an appropriate manner.
7. Applicants under age must present proof of permission to enter the service from parents or those responsible for them.

The following are excluded from appointment :—

1. Those who, through conviction in a criminal court have lost the right to enter the State service providing they have not regained same.
2. Those who have been bankrupts or who are trustees or guardians.
3. Those who have been employed by the State, and through some fault of their own have been dismissed therefrom.

Should a person who according to these regulations is excluded from appointment by any chance be appointed without the approval of the Minister of Commerce, he shall be considered as no longer belonging to the Service from the time that his undesirability for the Service is proved, and at once be dismissed therefrom without further ado.

4. Appointment is made by the Wireless Telegraph Department in Trieste by means of Service contract and either :—

(*a*) by notice, or

(*b*) for a certain voyage.

For appointment for a voyage only temporary use of the services of an operator as far as can be foreseen would be made, and State officials do not undertake any responsibility for the disadvantages which may be caused to an operator through the prolongation of the duration of a voyage of any ship where he may be engaged.

When appointments are being considered, those persons who have requested the Inspectors' Department of the Service to put them in special or certain positions will first be taken into account.

The Service contract will be made in duplicate, one copy being handed to the employee against receipt for same, the other one being kept by the officials of the Department.

5. Wireless operators will be sworn in by the officials of the Wireless Department. The form of oath will be the one prescribed for other State officials.

C.—Rights and Duties.

6. For appointments subject to notice salary will be paid monthly. The monthly salary is due from the first to the last day of service inclusive.

Whether the salary commences or ends during the course of a calendar month, only the aliquote part will be paid, and 30 days will be reckoned as being one month.

7. For appointments for voyages salary will be paid by the day. The daily salary is due from the first to the last day of service inclusive.

In case a telegraphist who was appointed for a voyage should enter upon duty where he is subject to notice, he is entitled to any money outstanding under the conditions of the previous terms of appointment.

8. The payment of salary as mentioned in Par. 6 and 7 will take place on the last day of each month, but should an operator leave the service on a day other than the last of the month, he will be paid when he leaves. During a voyage the payment of salary will be made by the paymaster of the shipowners.

For voyages beyond the Mediterranean and Black Seas only one-half of the salary will be paid during the voyage, the other half being paid by the Wireless Telegraph Dept. at the end of the voyage.

9. Beside the regulation pay as per Par. 6 and 7, the wireless operator has a right to the following :—

(1) The benefits conferred by the Regulations of the Board of Trade of March 1st, 1912, R.G.Bl. No. 43 from the shipowners, and especially for sustenance and attention on board.

(2) A share in the profits of telegrams transmitted as per the special rules.

Telegraphists appointed subject to notice are further allowed : —

(*a*) For the period when not on board they receive an extra allowance of kronen 2 per day.

(*b*) For proofs of a mastery of a foreign language or languages, kronen 5 per month for each foreign language.

10. Operators may wear uniform whether on or off duty, but the wearing of any other uniform than that described in Supplement 5 is not permitted. Operators must use or allow to be used the wireless installations under their care *only* for the benefit of the State, and are moreover to continually bear in mind the safety of the ship.

Before going aboard, wireless operators must see that they have a sea Service Book in their possession.

E.—Cancellation of the Service Contract.

19. The Service Contract of operators appointed on notice may be cancelled :—

(1) By a six months' notice from either party.

(2) By the obligation to enter the military service as prescribed by the law for the duration of the said military service.

(3) By dismissal.

20. The Service Contract of operators appointed for voyages may be cancelled :—

(1) After the expiry of three days from the date of return from a voyage.

(2) By dismissal.

21. Except when a telegraphist has been dismissed from the Service, he has the right to a reference covering the period of his service.

F.—Staff Records.

22. At the Inspectors' Office of the Wireless Telegraph Department complete data regarding each wireless operator will be kept. The operator is bound to give any particulars by document or otherwise, and also to report any changes necessary in the said data.

BAHAMAS

AN Act to restrict the use of wireless telegraphy except under certain conditions (1902) :—

1. This Act may be cited for all purposes as "The Wireless Telegraphy Restriction Act, 1902."

2. From and after the passing of this Act it shall be unlawful for any person in these islands to transmit or receive messages across the seas by means of any wireless telegraphy whatsoever (*" or to erect, construct, establish, or maintain any instrument or apparatus for the purpose of transmitting or receiving such messages "*—added by an Act of 1903), unless such person shall have previously received the consent in writing, under the hand of the Colonial Secretary of the Governor in Council, authorising the same.

3. Any person violating the provisions of this Act shall be liable, on summary conviction, to a penalty not exceeding £200, anything in the Magistrates' Act, 1896, to the contrary notwithstanding.

BARBADOS

Wireless Act, 1905.

THIS Act may be cited as the Wireless and Submarine Telegraph Act, 1905.

2. (1) The West India and Panama Telegraph Company shall not lay down or maintain a new telegraph cable nor shall any other company or person lay down or maintain any telegraph cable upon the foreshore and bed of the sea except under and in accordance with an Act of the Legislature.

(2) A person shall not establish any wireless telegraph station, or instal or work any apparatus for wireless telegraphy in any place in this island except under and in accordance with an Act of the Legislature.

(3) If the West India and Panama Telegraph Company lays down or maintains a new telegraph cable or if any other company or person lays down or maintains any telegraph cable upon the foreshore or bed of the sea without the authority of an Act of the Legislature in that behalf, the company or person shall be liable, on conviction before a Police Magistrate, to a penalty not exceeding £100 and shall forthwith remove the telegraph cable, and if the telegraph cable be not removed within one day after such conviction the company or person shall be liable to a penalty not exceeding £50 for each day thereafter during which the company or person shall fail to remove the telegraph cable. Provided, that the Governor-in-Executive Committee may at any time after the expiration of one day from the date of the conviction cause the same to be removed and destroyed.

(4) If any person establishes a wireless telegraph station without the authority of an Act of the Legislature in that behalf, or instals or works any apparatus on any place in this island for wireless telegraphy without such authority in that behalf he shall be liable, on conviction before a Police Magistrate, to a penalty not exceeding £100, and further be liable to forfeit any apparatus for wireless telegraphy installed or worked without such authority.

(5) If a Police Magistrate is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without legal authority in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place within his jurisdiction without such authority in that behalf, he may grant a search warrant to any police officer named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station or place and

to seize any apparatus which appears to him to have been used, or intended to be used, for wireless telegraphy therein.

(6) No proceedings shall be taken under any of the provisions of this section except by order of the Governor.

3. This Act shall continue in force until the 31st day of March, 1907. (*By an amending Act of* 1908, *this Act continues in force until repealed by the Legislature.*)

BELGIUM

THE following Decree came into force on November 3rd, 1913:—

In virtue of the law of March 6th, 1818, relating to the penalties to be imposed for contraventions of the administrative regulations in the interior, as also to those which might be called into force by the by-laws of provincial and communal authorities, on the suggestion of our Minister of Marine, Posts, and Telegraphs, we do and hereby decree:—

1. On Belgian territory and on Belgian ships every kind of electrical radiating apparatus or installation capable of being used for or interfering with either the transmission or the reception of radio-telegraphic or radio-telephonic signals, as well as every projected removal of or modification to, or in the arrangement of an authorised installation, must be submitted to the Marine Department previous to any steps being taken which may be considered as a commencement of such a project.

The applicant for a licence must indicate the nature of the installation, the object of its exploitation as regards ship stations, the tariff of taxes which it is intended to charge, the details of the apparatus and methods to be employed, the wave length, the hours of working, and generally all information of such a nature as will permit of a complete study of the project; it must further state what measures are proposed in order to prevent disturbance in the service of other stations, either official or authorised.

2. The granting of a licence is subject to the reserve and conditions which are considered necessary in the interest of the public safety and convenience, this also including the safeguard of the public and service correspondence.

3. A new licence becomes necessary:—

(*a*) If the station has not been installed or modified and put into service within the time specified in the licence.

(*b*) If the station has been put into action or exploited in conditions other than those stipulated therein.

4. This regulation applies to all installations which were in existence prior to the Act being put into force, and the owners of such installations must forthwith apply for a licence, as prescribed in Article 1 of this Act,

and in the meantime they must suspend the operation of such stations until the granting of a licence.

5. Vessels registered in foreign nations, fitted with wireless telegraph apparatus previous to their entry into Belgian waters, shall not be subjected to the previous dispositions, but they must procure a permit from the Belgian Minister to enable them to operate. Neither do the foregoing dispositions prevent distress signals being sent or received from other ships.

Foreign vessels are required, on entering Belgian waters, to cease all operations which might interfere with radio-telegraphic or radio-telephonic stations in Begium.

6. On Belgian territory and in Belgian waters, as well as on board Belgian vessels to be found in foreign waters or harbours, the duly sworn delegates of the Government (according to Article 8 of the law of July 10th, 1908) have, at all times of the day or night, free access to the lands, buildings, ships or other craft, where licensed installations are working or for which a regular certificate of authorisation has been granted. The proprietors, exploiters, owners, commanders, directors, managers, chiefs, or employees of any description are bound to facilitate by all means in their power to help such delegates in the carrying out of their duties of examining such stations.

7. Proprietors, exploiters, and owners are responsible under civil law for the fines imposed on their commanders, directors, managers, chiefs, or employees.

8. The Minister of Marine, Posts, and Telegraphs is charged with the execution of the present law.

9. The present law will come into force the day following the date of publication (November 4th, 1913).

BERMUDA

The Wireless Telegraph Act, 1903.

FROM and after the passing of this Act it shall not be lawful for any person in these islands to transmit or receive messages across the seas (*by an Act of* 1910 *this was amended by the addition of the words " or between places in these islands "*) by means of any wireless telegraphy, or to instal, erect, construct, establish, or maintain in these islands any instrument, apparatus, or other thing for the purpose of transmitting or receiving such messages, unless such person shall hold a written licence from the Governor authorising the same, and such licence shall be in force and unrevoked; and any person who shall offend against the provisions of this enactment shall be liable, on summary conviction before any two justices, for a first offence to a penalty not exceeding £25, and for a second or subsequent offence to a penalty not exceeding £100.

2. Any licence issued by the Governor under this Act may at any time be revoked by him by a written notice given to the person to whom such licence was issued, or by the publication of such revocation in the *Gazette*, and after such revocation such person shall not be entitled to any privilege or protection by virtue of such licence.

3. Any licence under this Act may be issued subject to such conditions and restrictions as the Governor may from time to time consider desirable in the public interest.

4. If any Justice of the Peace shall be satisfied from the information on oath of any credible person that there is good reason to believe that any of the provisions of the first section of this Act have been or are being violated, he may issue a search warrant to any constable or constables authorising and requiring him or them, with or without assistants, at any hour of the day or night, to enter into, and go through and search, inspect and examine any premises where such violation is suspected to have been or to be committed for the purpose of ascertaining whether such violation has been or is being committed; and if, upon such search, any instrument, apparatus, or other thing apparently used, or capable of being used, for the purpose of transmitting or receiving messages across the sea by wireless telegraphy shall be found, it shall be lawful for such constable or constables to seize and carry away, or otherwise to secure the same; and if, upon a hearing before any two Justices of the Peace, they shall adjudge and determine that any such instrument, apparatus, or other thing, has been used, or is capable of being used, for either of the purposes aforesaid, they may adjudge the same to be forfeited, and such forfeiture may be in addition to any penalty which may be imposed on any person under this Act in respect of such instrument, apparatus, or other thing.

5. Any instrument, apparatus, or other thing which shall be adjudged to be forfeited under the provisions of this Act shall be sold or otherwise disposed of in such manner as the Governor shall direct, and if sold the net proceeds of such sale shall be paid into the public treasury, after payment thereout of such reward, if any, as the Governor shall award to the informer, or to any constable or constables executing the search warrant under which such articles were seized.

6. This Act shall continue in force until and throughout the last day of December, 1907. (*By the Wireless Telegraphy Act Continuing Act,* 1907, *the Act of* 1903 *is continued in force indefinitely.*)

1909.

The Governor having informed the Legislature that a despatch has been received from the Secretary of State for the Colonies drawing attention to the desirability of making Regulations as to the use of Wireless Telegraphy apparatus on merchant ships,

whether British or foreign, while in the territorial waters in these islands, and it was deemed expedient to confer on the Governor in Council the power to make such Regulations as may be necessary for the purpose aforesaid, and the following Act came into force in March, 1909:—

1. It shall be lawful for the Governor in Council to make regulations as to the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in the territorial waters of these islands, for preventing such apparatus being worked so as to interfere with naval signalling, or with the working of any wireless telegraph station lawfully established or worked in these islands, or with the transmission of messages between any such station and ships at sea.

2. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters of these islands shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases, or in such cases as may be deemed desirable.

3. Any regulations made under this Act may impose fines for any breach thereof not exceeding £20 for a single offence, and not exceeding £5 a day for a continuing offence, and such fines shall be recoverable with costs in any Court of Summary Jurisdiction consisting of any two Justices of the Peace.

4. All regulations made under this Act shall become operative on the date of their publication in the *Gazette*, or on such later date as shall be fixed by the regulations for the purpose.

BRAZIL

THE following is an extract from an Act relating to the Merchant Service:—

Article 159.—Those boats must without exception be provided with radio-telegraphic apparatus, approved by the General Direction of Telegraphs, with the necessary power to allow of communication with the wireless stations in the zones in which they trade, when:—

(*a*) they carry passengers and are employed in the coastal trade, of any description whatsoever, and having a registered tonnage of over 300 tons, and for those boats employed in river trade having a registered tonnage of over 500 tons.

(*b*) they are only employed in the coastal trade as cargo boats but carry over 30 (thirty) souls all told.

Article 160.—After the promulgation of this regulation, no ship shall be registered by any Port Authority if it has not complied with the regulations of the preceding Article, the licence to navigate being refused to any ship which, within one year from the date of the promulgation of this regulation, shall not have fulfilled the dispositions set forth herein.

Law No. 2,719 of December 31st, 1912, fixes the wireless rates at 6 francs for a telegram up to 10 words, and 60 centimes for each word extra; included in the rate is the transmission between a coast station and the telegraph stations to which the wireless station is directly joined up.

There is also a tax of 25 centimes a word for every State that the telegram passes through. The ship tax, as fixed by the Telegraph Department, is 240 reis a word, and the coast station and forwarding charge is 360 reis, equalling together one franc; 10 words are charged for, and the extra tax of 25 centimes is collected when necessary.

A new wireless district has been created by Law No. 2,738 of January 4th, 1913, with a credit of 732 contos, to include the Acre, Amazonas and Para wireless stations, and after these stations have been taken over by the Telegraph Department they will be opened to public traffic.

BRITISH GUIANA

THIS Ordinance may be cited as "The Telegraph Ordinance, 1903."

2. In this Ordinance "Telegraph" means an electric, galvanic, or magnetic telegraph, and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communication by means of electricity, galvanism or magnetism, whether the same be transmitted by means of wires or cables or without wires or cables.

3. The Governor-in-Council shall have the exclusive privilege of establishing, maintaining and working telegraphs between the Colony and places outside of the Colony.

Provided that the Governor-in-Council may grant a licence on such conditions and in consideration of such payments as he thinks fit, to any person, company or body corporate, to establish, maintain, or work a telegraph between the Colony and any place or places outside the Colony; and

Provided that nothing in this Ordinance shall apply to or in any way affect the rights already granted to the West India and

Panama Telegraph Company, Limited, under any Ordinance or Ordinances passed before the commencement of this Ordinance.

ORDINANCE NO. 7 OF 1910.

1. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship registered in the Colony, except under and in accordance with a licence granted in that behalf by the Governor-in-Council.

(2) A person shall not work any apparatus for wireless telegraphy installed on any merchant ship (whether British or foreign) whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor-in-Council, and the Governor-in-Council may, by any such regulations, impose penalties recoverable summarily for the breach of any such regulations, not exceeding fifty dollars for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour and be liable on summary conviction thereof to a penalty not exceeding fifty dollars, and, on conviction on indictment, to a fine not exceeding five hundred dollars, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence.

(4) If a Justice of the Peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship within his jurisdiction without a licence in that behalf or contrary to the provisions of the regulations made under sub-section two of this section he may grant a search warrant to any police officer or any officer appointed in that behalf by the Governor or the Postmaster-General and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

(5) The expression "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: *Provided*, That nothing in this Ordinance shall prevent any person from making or using electrical apparatus for

Hon. Agar Wynne

**Postmaster-General,
Commonwealth of Australia.**

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BRITISH NO...

BRITISH NORTH BORNE...
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actuating machinery or for any purpose other than the transmission of messages.

2. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1910.

BRITISH HONDURAS

Ordinance No. 13.—1903.

It shall not be lawful for any person to use or establish any apparatus or installation for the purpose of operating a wireless electric telegraph without a licence from the Governor on such terms and conditions as the Governor may from time to time prescribe.

2. Any person who commits any offence against the provisions of this Ordinance is guilty of a misdemeanour within the meaning of the Criminal Code.

BRITISH NORTH BORNEO

British North Borneo has been included as a party in the International Radiotelegraphic Convention.

There has reached us just as we go to press an advance copy of the "Wireless Telegraph Proclamation," which will come into force shortly. The main provisions are as under:—

1. This proclamation may be cited as "The Wireless Telegraphy Proclamation, 1914," and shall come into force upon the publication thereof in the *Gazette*.

2. (i.) In this proclamation the expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraph Proclamation, 1901," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received;

The expression "locally owned ship" means a ship owned wholly by the Government or by bodies corporate established under and subject to the laws of this State, and having their principal place of business within this State.

(ii.) Nothing in this proclamation shall prevent any person from making or using apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, license the establishment of any wireless telegraph station, or the installation or working of any apparatus for wireless telegraphy, in any place in this State or on board any locally owned ship.

4. (i.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in

this State or on board any locally owned ship except under and in accordance with a licence granted in that behalf by the Governor.

(ii.) Every such licence shall be in such form and for such periods as the Governor may determine, and shall contain such terms, conditions, and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (i.) Any person establishing a wireless telegraph station without a licence in that behalf, or installing or working any apparatus for wireless telegraphy without a licence in that behalf, shall be liable to a fine not exceding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, provided that no proceedings shall be taken against any person under the proclamation except with the previous sanction of the Governor.

(ii.) On being satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf, a magistrate may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (i.) The Governor may make and, when made, vary or cancel rules more particularly for all or any of the following matters:—

(*a*) For prescribing the form and manner in which applications for licences under this proclamation are to be made;

(*b*) For prescribing the fees payable on the grant of any licence;

(*c*) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship or a British or a foreign ship, in the waters of this State shall be worked so as to prevent the interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in this State or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) For prohibiting, except with the special or general permission of the Superintendent of Telegraphs, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship or a British or a foreign ship, whilst such ship is in any of the harbours of this State;

(*e*) For prohibiting or regulating, in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that the Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether locally owned ships or British or foreign ships, in the waters of this State, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time, and either in all cases or in such cases as may be deemed desirable;

(*f*) And generally for the more effectual carrying out of the provisions of this proclamation.

(ii.) No rules made in respect of the matters described in paragraphs (*c*), (*d*), and (*e*) of sub-section (i.) shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. On an application for a licence proving to the satisfaction of the Governor that the whole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted to such applicant, subject to such special terms, conditions, and restrictions as the Governor may think proper that such licence shall not be subject to any rent or royalty.

8. (i.) Every omission or neglect to comply with, and every act done or attempted to be done contrary to, the provisions of the proclamation, or of any rule made thereunder, or in breach of the conditions and restrictions subject to or upon which any licence has been issued, shall be deemed to be an offence against, not otherwise specially provided for, the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine not exceeding five hundred dollars.

(ii.) All convictions, forfeitures, and fines under this proclamation, or any rules made thereunder, may be had and recovered before the Court of a Magistrate of the First Class.

CANADA

WIRELESS Telegraphy in the Dominion was until last year regulated by Part IV. of the Telegraphs Act. (See YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913. Pp. 111 and 112.) This is now replaced by the Act which was assented to on June 6th, 1913, and reads as follows:

1. This Act may be cited as *The Radiotelegraph Act*.

2. In this Act, unless the context otherwise requires—

(*a*) "Minister" means the Minister of the Naval Service;

(*b*) "radiotelegraph" includes any wireless system for conveying electric signals or messages including radiotelephones;

(*c*) "coast station" means any radiotelegraph station which is established on land or on board a ship permanently moored and which is used for the exchange of messages and electric signals with ships at sea;

(*d*) "land station" means any radiotelegraph station or installation of radiotelegraphic apparatus which is not a coast station or a ship station;

(*e*) "ship station" means any radiotelegraph station established on board a ship which is not permanently moored.

3. No person shall establish any radiotelegraph station or instal or work any radiotelegraph apparatus in any place in Canada or on board any ship registered in Canada except under and in accordance with a licence granted in that behalf by the Minister.

4. From and after the first day of January, nineteen hundred and fourteen, no passenger steamer, whether registered in Canada or not—

(*a*) licensed to carry 50 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 200 nautical miles from one port or place to another port or place; or,

(*b*) licensed to carry 250 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 90 nautical miles from one port or place to another port or place; or,

(*c*) licensed to carry 500 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 20 nautical miles from one port or place to another port or place

shall leave or attempt to leave any Canadian port unless such steamer is equipped with an efficient radiotelegraph apparatus, in good working order, capable of transmitting and receiving messages over a distance of at least one hundred nautical miles by night and by day, and in charge of a person fully qualified to take charge of and operate such apparatus.

(2) The owner, master or other person in charge of any passenger steamer which leaves or attempts to leave any Canadian port contrary to the provisions of this section shall, on summary conviction, be liable to a fine not exceeding $1,000 and costs, and such fine and costs shall constitute a lien upon such passenger steamer.

(3) This section shall not apply to passenger steamers plying on the rivers of Canada, including the River St. Lawrence as far seaward as a line drawn from Father Point to Point Orient, or on the Northumberland Straits, or on the Georgian Bay, or on the lakes of Canada other than Lakes Ontario, Erie, Huron and Superior, and the provisions of paragraph (*c*) of subsection I of this section shall not apply to steamers making voyages on Lakes Ontario, Erie, Huron and Superior, the

regular route for which is not at any point more than seven miles from the shore.

(4) This section shall not apply to steamers calling at Canadian ports solely for the purpose of obtaining bunker coal or provisions for the use of such steamer, or through stress of weather, or for repairs.

5. All persons operating land or cable telegraph lines shall transmit all messages destined to or coming from ship stations via coast stations under such rules as may be made by the Board of Railway Commissioners for Canada.

6. No one shall be employed as a radiotelepraph operator at any coast or land station unless he is a British subject, and all radiotelegraph operators at shore or land stations, or on ship stations on board any vessel registered in Canada, shall take and subscribe a Declaration of Secrecy in the form set forth in the Schedule to this Act, before a judge of any court, a notary public, a justice of the peace or a commissioner for taking affidavits, having authority or jurisdiction within the place where the oath is administered.

(2) Every person who has made the Declaration of Secrecy and who, either directly or indirectly, divulges to any person, except when lawfully authorised or directed so to do, any information which he acquired by virtue of his employment, is guilty of an offence and shall be liable on summary conviction to a penalty not exceeding $100 and to imprisonment for a term not exceeding six months.

7. Any person who sends or transmits or causes to be sent or transmitted any false or fraudulent distress signal, message, call or radiogram of any kind, or who without lawful excuse interferes with or obstructs any radio-communication, shall be guilty of an offence and shall be liable on summary conviction to a penalty not exceeding $500 and costs or six months' imprisonment.

8. If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a radiotelegraph station has been established without licence in that behalf, or that any apparatus for radiotelegraphy has been installed or worked in any place or on board any ship registered in Canada within his jurisdiction without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Minister and named in the warrant.

(2) A warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any radiotelegraph apparatus which appears to him to be there used or intended to be there used for radiotelegraphy.

9. Everyone who establishes a radiotelegraph station or instals or works any radiotelegraph apparatus in violation of the provisions of this Act, or of any regulation made hereunder, shall be liable on summary conviction to a penalty not exceeding $50, and on conviction on indict-

ment to a fine not exceeding $500 and to imprisonment for a term not exceeding twelve months, and in either case shall be liable to forfeit to His Majesty any radiotelegraph apparatus installed or worked without a licence.

(2) No proceedings shall be taken against any person under this section, except by order of the Minister.

10. The Governor in Council may—

(*a*) prescribe the tariff of fees to be paid for licences and for examination for certificates of proficiency held and issued under the provisions of this Act;

(*b*) accede to any international convention in connection with radiotelegraphy, and make such regulations as may be necessary to carry out and make effective the terms of such convention and prescribe penalties recoverable on summary conviction for the violation of such regulations; provided that such penalties shall not exceed $500 and costs;

(*c*) make regulations for the censorship and controlling of radiotelegraph signals and messages in case of actual or apprehended war, rebellion, riot or other emergency.

11. The Minister may make regulations—

(*a*) prescribing the form and manner in which applications for licences under this Act are to be made;

(*b*) classifying ship, coast and land stations and prescribing the type and range of the regular equipment and the emergency equipment to be installed in the several classes of stations;

(*c*) defining the different kinds of licences that may be issued, their respective forms and the several periods for which they shall continue in force;

(*d*) prescribing the conditions and restrictions to which the several licences shall respectively be subject;

(*e*) prescribing the different classes of certificate of proficiency and the class of certificate necessary to qualify persons as operators for the several classes of ship, coast and land stations;

(*f*) for the examination of persons desiring to obtain certificates of proficiency as radiotelegraph operators and to determine the qualifications in respect of age, term of service, skill, character and otherwise to be required for such certificates;

(*g*) prescribing the watches to be kept by operators and the number of operators to be maintained and kept at the different classes of ship, coast and land stations;

(*h*) for the inspection of radiotelegraph stations;

(*i*) to provide how radiotelegraph apparatus installed upon any foreign or British ship (whether such British ship is registered in Canada or elsewhere) shall be operated while such ship is within the territorial waters of Canada;

(*j*) to compel all radiotelegraph stations to receive, accept, exchange and transmit signals and messages with such other radiotelegraph stations and in such manner as he may prescribe;

(*k*) for the effective carrying out of the provisions of this Act.

(2) The Minister may, by regulation, authorise the imposition of a penalty not exceeding fifty dollars and costs or three months' imprisonment for the violation of any regulation made under this section, and any such penalty may be recovered upon summary conviction.

12. All regulations made under the provisions of the two sections immediately preceding shall be published in *The Canada Gazette,* and shall be laid before both Houses of Parliament within ten days after the publication thereof if Parliament is then sitting, and if Parliament is not then sitting, then within ten days after the next meeting thereof.

13. His Majesty may, at any time, assume, and for any length of time retain, possession of any radiograph station and of all things necessary to the sufficient working thereof, and may, for the same time, require the exclusive service of the operators and other persons employed in working the same; and the person owning or controlling the station shall give up possession thereof, and the operators and other persons so employed shall, during the time of such possession, diligently and faithfully obey such orders, and transmit and receive such signals, calls and radiograms as they are required to receive and transmit by any duly authorised officer of the Government of Canada.

(2) If the Minister and the person owning or controlling any radiotelegraph station taken possession of by the Crown under the provisions of this section cannot agree as to the compensation to be paid by the Crown for such taking possession, the Minister shall refer the matter to the Exchequer Court of Canada for adjudication.

14. Part IV. of *The Telegraphs Act* is repealed.

SCHEDULE.

DECLARATION OF SECRECY.

I, A. B., solemnly and sincerely promise and declare that I will faithfully and honestly fulfil the duties which devolve upon me as radiotelegraphic operator, and that I will not, either directly or indirectly, divulge to any person, except when lawfully authorised or directed so to do, any information which I acquire by virtue of my employment as such operator, or which may come to my knowledge through the operation of any radiotelegraphic installation.

Declared before me at ....,
this .... day of ...., 19....

[*Signature of declarant.*]

Ship Licence.

THE herein named ...., resident of ...., is hereby licensed to establish and operate a wireless telegraph station on board the ship .... for the term or period commencing ...., and terminating on ...., and to instal and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of one dollar, being the licence fee for the privilege above named.

This licence is subject to the following terms, conditions and restrictions :—

1. In this licence the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something, either in the subject or context, repugnant to such construction, that is to say :

The expression "marine signalling" means signalling by means of any system of wireless telegraphy between two or more ships, between ships and shore stations and any other wireless telegraph station, or between shore stations and ships; and the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. (1) The licensee shall not establish, instal or operate any apparatus for wireless telegraphy, except the apparatus hereinafter called the "licensed apparatus" specified in the said schedule hereto.

(2) No tolls, fees or other consideration shall be received, levied or collected by the licensee until the same have been approved of by the Board of Railway Commissioners.

3. (1) The licensee shall so operate the licensed apparatus as not to interfere with the working of any wireless telegraph station established in Canada, or with marine signalling on the waters or territory of Canada or neighbouring waters or territory.

(2) With a view to preventing such interference as aforesaid, the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees :—

(*a*) With respect to all arrangements to be adopted for the purposes of syntony or enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station;

(*b*) With respect to any alteration of messages which the Minister may think necessary; and

(*c*) Generally with respect to avoiding interference between one wireless telegraph station and another.

(3) The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

4. (1) The licensee shall, if so required in writing by the Minister, cease to operate the licensed apparatus for such period (not exceeding ...... hours in any one day) as may be specified by the Minister.

5. Subject to the provisions of the licence, and in accordance with the regulations issued from time to time by the Minister, the licensee shall transmit and receive messages by means of the licensed apparatus to and from any coast station or to and from any other ship without regard to the particular system of wireless telegraphy installed at such coast station or such other ship, on equal terms without favour or preference, whether as regards rates of charge, order of transmission or otherwise.

6. The licensee shall not be obliged to transmit and receive commercial messages by means of the licensed apparatus to and from a ship station on a ship registered in a country which does not adhere to the International Radiotelegraphic Convention, unless instructed so to do by the Minister in his regulations.

7. (1) If and whenever any department of the Government shall require the licensee, his servants or agents to transmit by means of the licensed apparatus any messages on His Majesty's service (including messages to and from ships of His Majesty's Royal Navy or Canadian Government vessels), such messages shall have priority over all other messages, and the licensee, his servants and agents shall, as soon as reasonably may be, transmit the same, and shall, until transmission thereof, suspend transmission of all other messages; and the rates to be charged on such messages shall not exceed half the rates charged the ordinary public.

(2) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

8. The licensee shall, so far as possible, receive from all other stations all requests for assistance and all signals of distress, and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in his power.

9. The licensee shall not divulge to any person (other than properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and transmitted by marine signalling or by any system of wireless telegraphy.

10. All messages transmitted by means of the licensed apparatus shall be copied in full in registers to be kept by the licensee for that purpose, and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its places of origin and ultimate destination and such further particulars as the Minister shall from time to time reasonably require to be shown, messages on His Majesty's service being in such registers distinguished from other messages. The licensee shall preserve all used message forms,

written and printed, and transcripts of messages and all other papers for such periods as is from time to time prescribed by the regulations of the International Radiotelegraphic Convention, and such registers and message papers shall be open to the inspection of the Minister or his officers thereto authorised at the head office of the licensee, in Montreal, between the hours of 10 a.m. and 5 p.m., on every day except Sunday or a public holiday.

11. The Minister or his officers may from time to time and at all reasonable times enter upon the herein licensed station for the purpose of inspection, and may inspect any apparatus fixed or in use in such station for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments.

12. The licensee shall prepare a detailed return of the messages handled by the licensed station during each month on the forms provided for that purpose by the Minister, and shall forward the same to the Minister at the end of each month.

13. (1) The licensee shall observe at the said station the provisions of the International Radiotelegraphic Convention as adhered to by His Majesty in respect of the Dominion of Canada and the detailed regulations from time to time made thereunder for carrying such provisions into effect.

(2) The licensee shall operate the licensed apparatus in accordance with any regulations which may be issued from time to time by the Minister.

14. Except with the consent in writing of the Minister, the licensee shall not assign or sublet the licence.

15. The licensed apparatus at the said ship station shall be worked only by a person or persons holding a certificate or certificates issued by the Minister.

Certificates shall be granted to persons of such technical proficiency, and shall be in such form and subject to such conditions as the Minister may from time to time prescribe.

16. The licensee shall carry this licence on the ship on which the ship station is established under this licence, and also such documents as may be prescribed by the Minister, for the purpose of enabling the licensee to communicate with coast stations in accordance with the rules and regulations of the International Radiotelegraphic Convention of Berlin, 1906.

17. If, and whenever, in the opinion of the Minister or any officer in command of one of His Majesty's ships of war, an emergency shall have arisen in which it is expedient for the public service that the Government shall have control over the transmission of messages by the licensed apparatus, it shall be lawful for the said Minister or officer, by

warrant under his hand, to direct and cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and, subject, thereto, for such ordinary service as to the said Minister or officer may seem fit, and in that event, any person authorised by the said Minister or officer may enter upon the stations of the licensee and take possession thereof and use the same as aforesaid.

(2) The Minister or any officer in command of one of His Majesty's ships of war may when he considers such an emergency as aforesaid to have risen, instead of taking possession of the stations of the licensee, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus, either wholly or partly and in such manner as he may direct, and such persons may enter upon the licensee's premises accordingly, or the said Minister or officer may direct the licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said Minister or officer may prescribe, and the licensee shall obey and conform to all such directions.

(3) In any case such as aforesaid, if the licensee shows that during the exercise of any of the powers aforesaid, his receipts for the licensed apparatus with respect to which the said powers have been exercised have been less than his receipts from the same source during a corresponding period, the Government shall pay to the licensee, as compensation for any loss of profit sustained by the licensee by reason of the exercise by the Minister of any of the powers hereby reserved, such sum as may be settled between the Minister and the licensee by agreement or as in case of difference may be determined by arbitration. Provided always that no such compensation as aforesaid shall be paid if not so far as the powers hereby reserved to the Minister are exercised for the purpose of preventing direct communication with any of His Majesty's enemies, and, save with the consent of the Minister no such compensation shall be paid if not so far as the powers aforesaid are exercised for the purpose of preventing direct or suspected communication with any of His Majesty's enemies or of protecting the interests of His Majesty under the apprehension of impending war.

18. In case of any breach, non-observance or non-performance by or on the part of the licensee of any of the terms or conditions herein contained and on the part of the licensee to be observed and performed, then and in any such case the Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted, and thereupon these presents, and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void.

19. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of wireless telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the working and user of wireless telegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada, by means of wireless telegraphy, with or to any person or persons whomsoever upon such terms as he shall, in his discretion, think fit.

20. Any notice, request or consent (whether expressed to be in writing or not) to be given by the Minister under these presents may be under the hand of any authorised officer for the time being of the Department of the Naval Service, and may be served by sending the same by registered letter to the licensee, and any notice to be given by the licensee, under these presents, may be served by sending the same by registered letter addressed to the Deputy Minister of the Naval Service, Ottawa, Ontario.

Regulations to Govern the Operation of Amateur Stations.

THE wave length is not to exceed 50 metres (this means the aerial must not exceed 30 ft. in length; there will be no limit to the number of wires which may be used in parallel in the same).

2. The power absorbed by the primary of the transformer or induction coil is not to exceed ½ k.w.

3. The aerial must be connected to the transmitting apparatus only when messages are being transmitted or when measurements are being taken. At all other times, such as when the spark is being tested or sending is being practised, the aerial must be disconnected from the transmitter.

4. A distinctive call signal is to be allotted to each station, all such calls being commenced with the letter "X"—*e.g.*, XAA, XAB.

5. The station must take every precaution to prevent interference with other stations.

6. The station, when working, must listen for the signal "STP," which will indicate that an experimental station is interfering with commercial business.

7. The latter signal will only be made use of by certain authorised Government stations, and will not be used unless absolutely necessary. The signal "STP" will be preceded by the signal allotted to the experimental station whenever possible, and will be followed by the signal of the controlling station. On receipt of the above signal the experimental station will cease to operate until the controlling station gives the signal "Cancel STP."

Regulations to Govern the Operation of Experimental Wireless Stations.

THE station is to be worked only by operators holding a Canadian Government "Operator's certificate," unless a wave length below 100 metres is used; the wave length will be specified in the licence.

2. A distinctive call signal will be allotted to each station, commencing with the letter "X"—*e.g.*, XAA, XAB.

3. The wave lengths reserved for naval signalling (600 to 1,600 metres) are to be strictly avoided.

4. The station, as far as possible, is to be operated in accordance with the Regulations of the International Radiotelegraphic Convention.

5. The station must take every precaution to prevent interference with other stations, including the avoidance in working of wave lengths which are being used between other stations, and must, before commencing to transmit a message, be sure that no commercial stations are working.

6. The station, when working, must listen for the signal "STP," which will indicate that an experimental station is interfering with commercial business.

7. The latter signal will only be made use of by certain authorised Government stations, and will not be used unless absolutely necessary. The signal "STP" will be preceded by the signal allotted to the experimental station, and will be followed by the signal of the controlling station. On receipt of the above signal the experimental station will cease to operate until the controlling station gives the signal "Cancel STP."

8. The aerial must be connected to the transmitting apparatus only when messages are being transmitted or when measurements are being taken. At all other times, such as when the spark is being tested or sending is being practised, the aerial must be disconnected from the transmitter.

9. The power used must not exceed ½ k.w.

10. The transmitting apparatus must be of the coupling type, and must comply with the following conditions:—

(*a*) Whatever may be the wave length for which the station is licensed, if

$w1$ the longer wave length emitted

$w2$ the shorter wave length emitted,

then $\dfrac{200\,(w1 - w2)}{w_1 + w_2}$ should be less than 10.

(*b*) If one or more spark gaps are used in the transmitting aerial, then the sum of such spark gaps shall not exceed 1 mm.

11. The station must be connected with the local telephone exchange, so that instant communication can be established with the local Government station.

CHINA

Hongkong

THE following Ordinance (No. 20 of 1913) to provide for the regulation of Wireless Telegraphy was passed on July 24th, 1913, and repeals the Ordinances published in the YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, pp. 155-158:—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. "Telegraph" means an electric, galvanic or magnetic telegraph and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communications by means of electricity, galvanism or magnetism.

The expression "Wireless Telegraphy" means any system of communication by "telegraph" (as defined in this Ordinance) without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: provided that nothing in this Ordinance shall prevent any person from making or using an electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may whenever he shall deem it expedient to do so license the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4.—(1.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2.) Every such licence shall be in such form and for such period as the Governor-in-Council may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5.—(1.) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Attorney-General.

(2.) If a Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus

for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6.—(1.) The Governor-in-Council may make regulations for all or any of the following matters:—

(*a*) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(*b*) For prescribing the fees payable on the grant of any licence;

(*c*) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) For prohibiting, except with the special or general permission of the Colonial Secretary, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British of foreign, whilst such ship is in any of the harbours of the Colony;

(*e*) For prohibiting or regulating, in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that his Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Colony, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2.) Provided that no regulations made in respect of the matters described in paragraphs (*c*), (*d*) and (*e*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions, and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8.—(1.) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine of five hundred dollars.

(2.) All convictions, forfeitures, and fines under this Ordinance or any Regulations made thereunder may be had and recovered before a Magistrate.

9. The Wireless Telegraphy Ordinance, 1903, the Wireless Telegraphy Ordinance, 1909, and the Wireless Telegraphy Amendment Ordinance, 1909 (THE YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, pp. 155-158), are hereby repealed.

THE following Regulations were made by the Officer Administering the Government-in-Council under the provisions of Section 6 of the Wireless Telegraphy Ordinance, 1913 (Ordinance No. 20 of 1913), on November 20th, 1913:—

1. Any person desirous of obtaining a licence for the establishment of a wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony, or on board any British ship registered in the Colony, must apply in writing to the Colonial Secretary. Such application must contain full particulars—

(*a*) of the place or ship in respect of which a licence is sought,

(*b*) of the nature of the apparatus which it is desired and proposed to instal and work, and

(*c*) of the purposes for which the installation is intended to be utilised.

2. The following shall be the fees payable on the grant of licences:

(*a*) for a licence under Section 3 for a land station \$2.50

(*b*) for a licence under Section 3 for a ship station \$2.50

(*c*) for an experimental licence under Section 7 .... *Nil.*

3. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with—

(*a*) Naval signaling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

Mr. R. Scott-Atkinson

Postmaster-General & Superintendent Government Telegraphs, British North Borneo.

[*To face page ...*

4. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony except with the special or general permission in writing of the Colonial Secretary of the Colony.

5. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that his Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. No proceedings shall be taken against any person under these Regulations except with the previous sanction of the Attorney-General.

Shanghai

WE understand that the Board of Communications at Peking is at present considering laws and regulations concerning wireless telegraphy. The existing wireless telegraph station at Shanghai is governed by the regulations of the International Convention.

Singapore

THE following Wireless Telegraph Ordinance was published by the Council Chamber at Singapore, under date the 5th January, 1914:—

All apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval Signaling, or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

No apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, shall be worked or used whilst such a ship is in any of the harbours of the Colony, except with the special or the general permission of the Postmaster of the Colony.

These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Weihaiwei

No. 1 of 1904.

1. It shall not be lawful for any person to use or establish any apparatus or installation for the purpose of operating a wireless electric telegraph without a licence from the Commissioner on such terms and conditions as the Commissioner may from time to time prescribe.

2. Any person who commits any offence against the provisions of this Ordinance shall be liable to a fine not exceeding $500 or in default of payment thereof to imprisonment for a term not exceeding six months, with or without hard labour.

DENMARK

THE following regulations became effective on February 1st, 1909:—

Publication concerning the decisions that will have to be observed in establishing and working of radiotelegraph stations and in handling of radiotelegrams.

In accordance with law No. 99 of 19th April, 1907, concerning wireless telegraphs (radiotelegraphs) and with the, in Berlin, the 3rd November, 1906, drawn up International Convention concerning radiotelegraphs, supplemented by appendix decisions, finishing protocol and service regulations, the following decisions will have to be observed in founding and working of radiotelegraph stations and in handling of radiotelegrams:

I.—Establishing of Radiotelegraph Stations.

1. On Danish soil and on board ships permanently anchored, such as lightships, etc., radiotelegraph stations (shore stations) can only be established by the Government.

2. On board ships under Danish flag, not owned by the Government itself, radiotelegraph stations (ship stations) may only be established and operated after permission has been obtained from the Department of Public Works.

The licence or a confirmed duplicate of it must always be carried on board the ship.

The licence may be withdrawn if the conditions for the fitting and operation of the station, set out therein, are not complied with; in such cases the entire apparatus belonging to the station must be removed.

3. Applications for licences to establish and operate radiotelegraph stations on board ships sailing under the Danish flag must be on forms

approved by the Department of Public Works, and must be accompanied by notification that the station will fulfil the following conditions:

(*a*) The system employed must be a syntonised system.

(*b*) The speed of transmission and reception must, under normal conditions, be not less than 12 words a minute, the word to consist of five letters.

(*c*) The radiotelegraph transmitter must in normal circumstances not work with a larger energy than 1 kw. Larger energy may, however, be utilised if the ship is obliged to interchange telegrams over a distance of more than 300 kw. with the nearest coast station, or if communication, due to interference, is not obtainable unless by an increase of energy.

(*d*) The station must be operated by one or more operators who have obtained certificates as specified below in section 7.

The station must not be opened for communication until the Telegraph Department has issued a certificate, which will only be granted after the Department, by inspection, is satisfied that the conditions set out in the licence granted by the Department for Public Works are fulfilled.

II.—Installation, Service and Operation of Private Ships' Stations.

4. The apparatus of ship stations must be in strict accordance with the conditions set out in the licence for their establishment.

5. The hours of service of each coast station are decided by the Government Department.

The hours of service for ship stations are decided by the ship stations themselves. Any alteration in hours of service must be reported to the Department of Telegraphs.

6. The normal wave length for ship stations is 300 m. Any ship station must be fitted to utilise this wave length, unless special permission is otherwise given. In addition to the above, wave lengths up to 600 m. may be employed.

7. The service of the ship station must be maintained by operators who are in possession of certificates granted by the Department for Public Works, which certificates specify the ability of the operator—

(*a*) In the maintenance of the apparatus;

(*b*) in the sending and receiving (by sound) of telegrams with a speed not less than 20 words a minute.

(*c*) and in knowledge of the regulations utilised, governing radiotelegraph service.

The operator is pledged to secrecy, and he is subject to the penalty, etc., for a breach of this condition as are the State telegraph operators.

In the event of a contravention of the regulations governing the operation of the radiotelegraph service, the certificate may be cancelled by the Department of Public Works.

8. The ship stations may be licensed for ordinary public telegraph communication, limited public telegraph communication (with specified ships, with specified shipping lines, with ships fitted with specified kind of apparatus, etc.), public telegraph communication over long distances, private telegraph communication, special telegraph communication (exclusively for public use, etc.).

The traffic of the ship station must be confined to that for which it is licensed, as specified in section 2; all stations are, however, bound to receive, to answer, and eventually further to communicate messages from ships in distress and give these absolute priority.

Ship stations have no responsibility whatever regarding the radiotelegraph communication.

Ship stations intended for public telegraph service must be provided with such printed forms, service journals, tariff lists, etc., as are necessary for this service; these forms are obtained from the Telegraph Department. Stations must furthermore be governed by all the instructions regarding the installation and operation of the station and the handling of the traffic issued by the Department of Telegraphs.

No unauthorised person must be allowed to enter the wireless cabin.

9. If technically possible, ship stations must interchange telegrams with other stations (coast or ship stations), without regard to the system of radiotelegraphy employed at the corresponding station. The interchange of telegrams with other ship stations must, however, be so arranged that the working of coast stations is not interfered with, these as a rule having the priority in public telegraph service.

The operation of a station must as far as possible be arranged so that it does not disturb other stations.

Exchange of superfluous signals and words is prohibited. Trials and practice are only permitted in so far as the service of other stations is not interfered with.

When a ship is in a Danish harbour the station must only be utilised for communication with ships in distress.

10. According to the International Convention, the Telegraph Department must notify the Berne Bureau of the ship installation, and the Telegraph Department can demand to be furnished with any information regarding the installation, service and apparatus of the ship station, both for this and for other purposes.

11. The Telegraph Department will see that all conditions for fitting and operation of ship stations are complied with. The inspectors for this purpose, who are selected by the Director of Telegraphs, must at any time on showing their authority be admitted to inspect and test the station, provided that the ship is within Danish waters. All information required by the said inspectors must be immediately given, and their directions must be complied with, pending the decision of the

Director of Telegraphs, or eventually of the Department for Public Works.

For the inspection daily maintenance and travelling expenses are allowed to the inspectors; these are paid by the Department of Telegraphs, but the amount will have to be refunded (on demand) by the shipping company.

12. All pecuniary liability in respect of the service of the ship station is payable entirely by the shipping company, without regard to whether the liability in any case may have been due to fault or negligence on the part of the operators.

13. The original radiotelegrams with appendices handed in at the ship stations must if possible be sent once a month by the ship station to the Department of Telegraphs.

III.—Handling of Radiotelegrams.

14. Radiotelegraph stations open for public service for the transmission and reception of telegrams may be used by any person, unless the service at the station is limited to a certain special kind of telegrams (see section 8).

The telegrams are divided into three classes:—

(1) State telegrams.
(2) Service telegrams.
(3) Private telegrams.

The right to transmit State telegrams and service telegrams, and the right to priority for such messages, is at any time governed by the conditions laid down in the International Telegraph Regulation and the Inland Telegraph Regulation governing transmission of such telegrams over ordinary telegraph systems.

15. Regarding the radiotelegraph traffic, the handling of telegrams is governed by the International Radiotélegraph Service Regulation, Articles IX., XI., XIV., XXXIV., XXXIX., XL., XLI. The traffic of telegrams to and from coast stations and over the ordinary telegraph and telephone system is at any time governed by the Inland and International regulations for such traffic.

16. State and service telegrams may under all conditions be written in code or cypher. Private telegrams in code or cypher may be interchanged only with coast stations of such countries where this method of communication is allowed.

17. The undermentioned terms or the appended abbreviations may be utilised; they are written between two double hyphens before the address, and are charged as one word:—

To addressee only delivered	: Egenhaendigt, or MP.
Delivered open . . .	: Aabent, or RO.
Private express telegram .	: Urgent, or D.
Telegram restante . .	: TR.
X Addresses . . .	: TMX.

18. The entire charge for the handling of a radiotelegram from the sender to the addressee is to be collected from the sender by the station where it originates. The station must not collect a larger amount than allowed in the tariffs.

19. The entire charge for radiotelegrams includes—

1. Charge for the radiotelegraphic handling, namely (*a*) "coast tax," which is allotted to the coast stations; (*b*) "ship tax," which is allotted to the ship station.

2. Charge for handling over the ordinary telegraph and telephone system paid according to the general regulations.

The coast tax for Danish coast stations is 15 ctm. per word.

The ship tax is decided by the owner of the ship station, subject to the approval of the Department for Public Works. It must not exceed 40 ctm. per word; a minimum charge per telegram may, however, be adopted, not exceeding the charge for 10 words. Service telegrams concerning the radiotelegraph service are handled without any charge. Press telegrams at reduced rates are not accepted.

20. Reimbursement of charges paid, and accounts with the Telegraph Department, are governed by International Radiotelegraph Service Regulations, Articles XXXV. and XXXVI. (compare Article XLI.).

IV.—Other Regulations.

21. Stations on board ships under foreign flags must not be operated during the time such ships are in a Danish harbour, except to answer and to forward messages from ships in distress.

22. When the interests of the State requires it, the Government may reserve to itself the right to prohibit all radiotelegraphic communications from ships, Danish or foreign, in Danish waters, and to make the necessary regulations to carry out such prohibition.

23. The maximum penalty payable to the State for contravening the foregoing regulations is 400 kroner (£22), and all unlawfully fitted or utilised apparatus may be confiscated. Such contraventions are adjudicated in the public police court, and proceedings may only be taken by direction of the Minister for Public Works.

24. These regulations are effective as from the 1st of February, 1909.

EAST AFRICA PROTECTORATE

The Wireless Telegraphy Ordinance (*see* Year Book of Wireless Telegraphy and Telephony, 1913, pp. 164-5) is repealed and the following Ordinance, which was passed in the Legislative Council on September 22nd, 1913, was assented to on October 13th, 1913:—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. The expression "wireless telegraphy" means any system of communication by telegraph as defined by the Indian Telegraph Act, 1883, without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, licence the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Protectorate or on board any British ship registered in the Protectorate.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Protectorate or on board any British ship registered in the Protectorate except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand and five hundred rupees or to imprisonment of either description for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Attorney-General.

(2) If a Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor may make regulations for all or any of the following matters:—

(i.) for prescribing the form and manner in which applications for licences under this Ordnance are to be made;

(ii.) for prescribing the fees payable on the grant of any licence;

(*iii.*) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Protectorate shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed or worked in the Protectorate or the waters thereof and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*iv.*) for prohibiting, except with the special or general permission of the Postmaster-General of the Protectorate, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the Protectorate;

(*v.*) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Protectorate, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (*iii.*) (*iv.*) and (*v.*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance and for every such offence not otherwise specially provided for the offender shall in addition to the forfeiture of any articles seized be liable to a fine of seven hundred and fifty rupees.

(2) All convictions, forfeitures and fines under this Ordinance or any Regulations thereunder may be had and recovered before a Magistrate of the first class, and every such Magistrate shall have jurisdiction to pass any sentence authorised by this Ordinance on any European or other Non-Native convicted of an offence against this Ordinance notwithstanding anything in any Ordinance or law limiting the jurisdiction of such Magistrate over Europeans and Non-Natives.

9. The Wireless Telegraphy Ordinance, 1908, is hereby repealed. Provided however—

(1) Every licence granted under the said Ordinance and in force at the commencement of this Ordinance shall be deemed to have been granted under this Ordinance.

(2) All Regulations made under the said Ordinance and in force at the commencement of this Ordinance shall be deemed to have been made under this Ordinance and shall continue in force until other provision is made.

EGYPT

WIRELESS Telegraphy is a State monopoly in Egypt in accordance with the following Khedivial Decree dated May 12th, 1906:—

1. Wireless Telegraphy shall be a State monopoly and no installation shall be established or used except by the Government or with the sanction of the Government.

2. The Minister of Public Works shall be responsible for administration of this law.

FALKLAND ISLANDS

THE following Ordinance relating to wireless telegraphy came into force on March 15, 1912:—

1. No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor in Council.

2. No person shall work any apparatus for wireless telegraphy installed on any merchant ship (whether British or foreign) whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor in Council, and the Governor in Council may, by any such regulations, impose penalties, recoverable before a Stipendiary magistrate or any two Justices of the Peace in a summary manner, for the breach of any such regulations, not exceeding twenty pounds for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship.

3. If any person establishes a wireless telegraph station without a licence in that behalf or installs or works any apparatus for wireless telegraphy without a licence in that behalf he shall be guilty of a misdemeanour and be liable on summary conviction thereof to a penalty not exceeding twenty pounds or to imprisonment not exceeding three months, and, on conviction in the Supreme Court, to a fine not exceeding one hundred pounds, or to imprisonment for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence.

4. If a Justice of the Peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship within his jurisdiction without a licence in that behalf or contrary to the provisions of the regulations made under this Ordinance, he may grant a search warrant to any constable or to any officer appointed in that behalf by the Governor and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

5. The expression "wireless telegraphy" means any communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

6. The Wireless Telegraphy Ordinance, 1903, is hereby repealed.

7. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1912.

FRANCE

THE following are the principal clauses of the Decree dated March 5th, 1907 (modified by the following Decrees: April 26th, 1910; February 5th, 1911; May 27th, 1911; November 20th, 1911), which superseded the Decree of February, 1903, referred to in the YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913 (pp. 126-7), and February 27th, 1904:—

1. Radiotelegraphic stations established or about to be established in France, Algeria and Tunis shall be classified as follows:—

(*a*) Coast or internal land station for carrying on commercial service.

(*b*) Naval coast stations.

(*c*) Military coast stations.

(*d*) Lighthouse or lightship stations.

In addition, private stations may be established temporarily when the necessary licences have been obtained.

2. The President of the Council, the Ministries of the Interior, of Public Works, Posts and Telegraphs, of War, Marine, Colonies, Foreign Affairs, Commerce and Industry, Public Instruction and Fine Arts are charged, in so far as concerns their respective departments, with the carrying out of this Decree.

In case of mobilisation the Ministries of Marine and War shall automatically assume control of all stations, without exception.

3. The choice of sites for the proposed range of a station and all technical conditions applicable to each projected station shall be submitted for the consideration of an Inter-ministerial Commission formed in accordance with Article 4 of this Decree. The function of this Commission is to study the various aspects of the services to be carried on and to indicate to the Administrative Departments affected the conditions that are necessary to reconcile their respective interests.

4. The Inter-ministerial Technical Commission shall be appointed by the Minister of Public Works, Posts and Telegraphs, and shall comprise the following members :—

One President and one Vice-President appointed by Presidential decree from the Departments interested.

Three representatives from the Ministry of Marine.

Three representatives from the Ministry of War.

Two representatives from the Colonial Office.

Two representatives from the Foreign Office.

Two representatives from the Ministry of Commerce and Industry.

Two representatives from the Ministry of Public Instruction and Fine Arts.

One representative from the Ministry of the Interior.

Four representatives from the Ministry of Public Works, Posts and Telegraphs, one representing the Department of Public Works and three the Post and Telegraph Administration.

A secretary who shall belong to the Post and Telegraph Administration. He shall have no voting powers.

5. The Commission shall examine the title to sites and technical conditions appertaining to all stations which shall constitute the French radiotelegraphic network; examine complaints regarding French stations; consider such administrative problems concerning the radiotelegraphic service as the Ministry of Public Works, Posts and Telegraphs deems fit to submit to it; institute experiments of general interest. The Commission shall be informed through the departments represented thereon of results obtained by various types of apparatus employed at stations in operation.

6. Except during periods of mobilisation all radiotelegraphic coast stations and stations carrying on commercial services, other than those which exist solely for experimental purposes, shall be open for the transmission of private telegrams.

7. The Post and Telegraph Administration shall be responsible for all matters concerning the collection of taxes, foreign stations, and the International Bureau at Berne. It shall supervise the administration of international regulations in so far as they concern commercial traffic passing through coast stations in France, Algeria and Tunis, as well as though stations on vessels of the mercantile marine.

8. Licences to establish private stations shall be granted by the Post and Telegraph Administration upon the recommendation of the Commission referred to in Article 4. Such licences shall only be of a temporary character, and the stations are strictly forbidden to interfere with the working of other stations.

GAMBIA

12th February, 1903.

AN Ordinance to secure the control of all telegraphic establishments within the Colony and Protectorate in so far as may be necessary for the public safety :—

1. No company, corporation, persons, or person whatsoever shall within the limits to which this Ordinance applies establish, maintain or use any telegraphic apparatus, mechanism or contrivance, of what nature or kind soever the same may be, without due permission and licence under the hand of the Governor previously obtained for that purpose.

It is hereby expressly declared that what is commonly known as "wireless telegraphy," including the Marconi apparatus and any similar or other mechanism or contrivance whatsoever for the transmission of telegraphic messages without the employment of wires or cables, is a telegraphic apparatus, mechanism, or contrivance within the meaning of this section.

2. It shall be lawful for the Governor-in-Council from time to time to make, and as he shall see fit repeal, alter or vary rules and regulations for all or any of the following purposes, viz. :—

Licensing companies, corporations, or individuals to establish, maintain, or use any telegraphic apparatus, mechanism or contrivance, whether for the service of the public or for any private purpose.

Attaching conditions, restrictions, and limitations to the exercise of the privilege by such licence conferred.

Attaching suitable penalties and forfeitures to the contravention of the prohibition above contained in section 1 of this Ordinance, and to the breach of any rule or regulation made thereunder, and

providing for the recovery thereof, summarily or otherwise. Provided that the penalty (over and above forfeiture) to be imposed for any one offence shall in no case exceed a fine of £200, or in default of payment thereof imprisonment with or without hard labour for a period not exceeding twelve months.

The exercise of all such powers and control over telegraphic establishments (by temporarily entering into possession thereof or otherwise) as may be necessary for the public safety, whether at all times or in any case of emergency which may arise.

And generally for the better carrying out of the purposes of this Ordinance.

Such rules and regulations shall come into force as from the date of publication thereof, subject to disallowance by His Majesty.

3. Nothing in this Ordinance contained shall invalidate or impair any agreement now in force entered into between the Governor of this Colony, or the Imperial Government on behalf of the Government of this Colony, and any telegraph company, relative to the laying down or landing of any telegraphic cable, the removal, renewal, maintenance and use thereof, or to the payment of any subsidy to such company by the Government of this Colony or any other the like matter.

4. This Ordinance may be cited for all purposes as "The Telegraphic Establishments (Maintenance of Control) Ordinance, 1903," and shall apply to the whole Colony and Protectorate and to the territorial waters thereof.

GERMANY

Sole Article:—The Act of April 6th, 1892, relating to telegraphs in the German Empire is modified as follows:—

1. Article 3 is completed by the following Paragraph 2:

Installations of electric telegraphs for transmission of messages without the aid of metallic wires of junction, shall not be established and worked, except with the authorisation of the State.

2. The following provisions are inserted after Article 3:

(3 *a*) Telegraphic installations which are not exclusively designed for the internal service of a ship, cannot be established and worked on German vessels, unless authorised by the State.

(3 *b*) The Imperial Chancellor shall decree the regulations concerning the working of telegraphic stations on board foreign vessels in German territorial waters.

3. Article 7 is completed by the following paragraph (2):

The provision of Paragraph 1, Phrase 1, does not apply till July 1st, 1913, to installations of the nature defined in Article 3, Paragraph 2.

The following regulations are decreed for the working of telegraphic installations on board foreign ships in German territorial waters, and are founded on Article 3 (*c*) of the "Telegraph Law of the German Empire" of April 6th, 1892, and March 7th, 1908, and under the reservation of Article 15 of this law:—

1. Ships of war are authorised, in a general manner,

(*a*) To exchange messages, signals, by means of optic and acoustic signals, submarine acoustic signalling excepted.

(*b*) To use wireless telegraphy, on condition that they do not disturb the radiotelegraphic service of the public coast stations, or the service of the coast or ship stations of the Imperial Navy.

In exchanging messages with German or foreign radiotelegraphic stations, foreign vessels must conform to the regulations of the "Decree for the Regulation of the Radiotelegraphic Service" and to the Decrees which may ultimately be promulgated.

2. Foreign vessels other than ships of war are authorised—till otherwise decreed—

(*a*) To exchange messages by means of optic and acoustic signals, submarine acoustic signalling excepted, and under the reservation that within the illumination zone of the navigable waters of the German coasts and islands the lights of the signal projectors or lanterns must not exceed that prescribed for fixed lights.

(*b*) To use wireless telegraphy in conformity with the provisions of the "Decree Regulating the Radiotelegraphic Service" and the decrees which may ultimately be promulgated; nevertheless, in the ports, roadsteads, and estuaries, and in the navigable waterways of the interior, wireless telegraphy can only be used on an authorisation being granted in writing by the Ministry of Posts and Telegraphs of the German Empire.

3. In the public interest the Articles 1 and 2 may be temporarily restricted or suspended.

4. Whosoever works telegraphic installations in a way not authorised by the preceding provisions is liable to fines determined in Article 9 of the "Law of Telegraphs," and in virtue of Article 40 of the Penal Code of the German Empire, all the apparatus designed for the transmission of wireless messages can be confiscated. Moreover, installations which have been worked without a licence can be, in conformity with Article 11 of the "Telegraph Law," removed or rendered unserviceable.

THE following are some of the principal conditions on which the concession for the installation and working of a radiotelegraph station on board ship is granted:—

1. The concession for the installation and working of the ship station may be withdrawn at any time.

2. The station must fulfil the following requirements:—

(*a*) The construction of the station must be in accordance with modern developments of science and technology.

(*b*) The ship station must be equipped in such a way as to be able to use the two wave-lengths of 600 and 300 metres.

(*c*) The waves must be as pure and little damped as possible. The use of sending arrangements, with which the production of the emitted waves takes place by direct sparking discharges of the antenna, is not permitted, except in cases of distress. However, it may be allowed for certain special stations (*e.g.*, for such on small ships) the primary energy of which does not exceed 50 watts.

(*d*) The power transmitted at the radiotelegraphic apparatus, measured at the terminals of the generator, must not under normal conditions exceed one kilowatt.

(*e*) With the reservation of the special provisions concerning the application of the 1,800 m. wave, a power of more than one kilowatt may be used if the ship must maintain communication over a distance exceeding 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, communication cannot be maintained except by means of an increase of power.

(*f*) The apparatus must be suitable for transmitting and receiving at a speed of at least 20 words per minute, five letters being counted as one word. Installations working with more than 50 watts must be equipped so as to be able to cover several distances within the normal range of transmission, the shortest of which shall be about 15 nautical miles.

(*g*) The receiving apparatus must be capable of reception up to 600 miles with the greatest possible protection against disturbances.

3. Ships belonging to the two first categories stated under Article 8, in addition to the ordinary apparatus, must be equipped with emergency gear having an independent source of power and capable of working for at least six hours, with a minimum range of 80 nautical miles in the case of ships in the first category, and of 50 nautical miles of those of the second category. The emergency gear is not necessary in the case of ships whose ordinary plant fulfils the conditions for emergency sets.

The emergency gear, as well as the ship stations themselves, must be placed as high as possible above the deck—viz., according to the structure of the ship and the available space, either equal to the height of the bridge or of the large boat's deck, so that in case of accident they shall be able to remain longest above the water. When using batteries for the emergency plants accumulators may be arranged in the station room itself, whilst acid accumulators, on account of the vapours which they develop, must be placed outside the station room, but in its immediate vicinity, and so that they are protected against outside influences.

4. The contractor must submit to the Imperial Telegraph Administration a description of the ship station, together with a plan of the circuits. Subsequent alterations of the technical equipment affecting transmission or reception must not be made without the consent of the Imperial Telegraph Administration.

5. In order to examine the prescribed arrangement of the ship's station, and the carrying out of the service, the officers of the Imperial Telegraph Administration are permitted at any time to enter the rooms where the apparatus are installed, and to inspect the working equipments.

6. The radiotelegraph service on the ship must be operated only by German subjects.

7. The service of the ship station must be carried out by an operator holding a certificate issued by the Imperial Telegraph Administration, or in an emergency, and for one journey only, by another Government which is a party to the International Radiotelegraphic Convention.

There are two classes of certificates.

The first-class certificate for the capability of the operator, with regard to:—

(*a*) The adjustment of the apparatus and knowledge of the methods of working.

(*b*) Transmitting of telegrams and receiving by sound at a speed of at least 20 words per minute.

(*c*) Knowledge of the regulations applying to the exchange of radiotelegraphic communication.

The second-class certificate may be issued to an operator who attains in transmitting and receiving a speed of 12 to 19 words per minute, but who fulfils the other conditions mentioned above. Operators holding a second-class certificate may be admitted:—

(*a*) On ships which use radiotelegraphy for their own service only and for the exchange of messages of the crew, in particular on fishing vessels.

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Minister of Waterways, Holland.

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(*b*) On all ships as junior operators, provided that such ships have on board at least one operator holding the first-class certificate. Nevertheless on ships placed in the first category mentioned in Article 8 the service must be carried on by at least two operators holding the first-class certificate.

Transmission may be made only by an operator holding either the first or second-class certificate, except in cases of emergency.

8. Ship stations are placed in three categories :—

1. Stations always open.
2. Stations having limited working hours.
3. Stations having no fixed working hours.

During navigation the following must remain permanently on watch :—

1. The stations of the first category.
2. Those of the second category during the hours that they are open for service, out of these hours these stations must remain on the watch for the first ten minutes of each hour.

The stations of the third category are not bound to perform any regular "listening" service.

9. The ship station operator is under the supreme authority of the captain or of the captain's representative, who, in his capacity as superintendent of the ship station, is entitled to note the contents of all telegrams provided he has been placed by the Imperial Telegraph Administration, or, in the case of ships that are permanently abroad, by a German Consulate (General or Vice-consulate), under the obligation of preserving the secrecy of correspondence.

10. The certificate may be withdrawn if, in case of any offences against the "Regulations for the Radiotelegraph Service," the operator has been found guilty after an inquiry.

11. If it is shown that the offence is due to the condition of the apparatus or to instructions given to the operator, the same procedure will be followed in respect of the licence issued to the ship.

12. The certificate may also be withdrawn if it is stated by an officer of the Imperial Telegraph Administration that the operator is no more in possession of the prescribed knowledge and skill. In the latter case a certificate will be granted to the operator after he has successfully passed a further examination.

13. Every change in the staff of the ship station must be reported immediately to the local post office of the home port.

14. The ship station is bound to interchange radiotelegrams with every coast station and with every other ship station, without regard to the particular system of radiotelegraphy employed.

15. The Radiotelegraph Service is regulated in accordance with the rules in the "Instructions for the Radiotelegraph Service." In addition, special instructions which may be issued by the Imperial Telegraph Administration must be observed also.

. . . .

22. The ship station must be in possession of the certificate from the Imperial Telegraph Administration, stating that the installation and the working of the station have been licensed by the authority named and the category in which the station is placed. This certificate must be kept in the station and presented upon the request of the authorities of the countries at the ports at which the ship calls.

Regulations have been adopted concerning the installation and working of wireless telegraph receiving stations. The licence, which may be revoked at any time, applies only to the use of stations for receiving time signals from Norddeich, which uses a wave of 1,650 m.

The installation must fulfil the following technical requirements:—

(*a*) The receiving apparatus shall be adjusted so that the owner of the station may alter the syntonisation only within the immediate vicinity of the prescribed wave-length. The adjustable wave-lengths shall not differ by more than 5 per cent. above or below the prescribed wave-length.

(*b*) The antenna shall not be larger than is necessary for the intended reception.

(*c*) The single parts of the oscillatory circuits, also of the antenna circuit, shall be connected firmly and permanently with each other by being soldered together; exceptions are only admissible at the connecting terminals of the detectors and of the telephone receivers.

(*d*) The soldered joints shall be enclosed in casing containing all the parts of the apparatus, and this must be sealed, so that only the handle of the tuning device and the connecting terminals of the detectors and of the telephones are accessible to the owner. For the connection of the antenna wire a sound insulating wrapper shall be used.

(*e*) No later connection of circuits or tuning devices shall be permitted.

The controlling officials of the Imperial Telegraph Administration, of the Imperial Naval Administraton, and of the Administration of the Army are permitted at any time to enter the premises where the apparatus is situated and to inspect the station and everything appertaining thereto. The licensee is pledged to

secrecy in respect of any messages that he may intercept. He must suspend working temporarily when requested to do so by the Imperial Telegraph Administration of the naval or military authorities.

THE German Official Journal No. 73 of 1913 published a Decree of the Chancellor of the 14th October, 1913, referring to the modification of regulations for the working of telegraph stations on foreign ships in German waters. According to these regulations, wireless telegraphic traffic of foreign ships in German waters and in German rivers is subject to the following:—

(*a*) Foreign men of war may use their apparatus on condition that the public coast stations and coast and ship stations of the German marine are not hindered. In exchanging traffic with German or foreign wireless stations the rules laid down in the "Anweisung fuer den Funkentelegraphendienst" (Regulations for the Wireless Telegraph service) must be followed.

(*b*) Other foreign craft are only permitted to use their wireless apparatus in accordance with the above-mentioned regulations, but within German ports, roadsteads, river mouths, as well as within inner waterways, wireless apparatus may only be used with the written permission of the German Postal Authorities.

GIBRALTAR

THE following Ordinance to prohibit the importation, keeping, use or establishment of any apparatus or installation for transmission of messages by wireless telegraphy by unauthorised persons in Gibraltar came into force on October 20th, 1903. This Ordinance has been amended by the "Wireless Telegraph Apparatus Amendment Ordinance, 1909, (February 3rd), and in the text below the amending words are shown in brackets:

1. This Ordinance may be cited as "The Wireless Telegraph Apparatus Ordinance, Gibraltar, 1903."

2. No person shall import, keep, use or establish in Gibraltar [*or on board any British ship registered in Gibraltar*] any apparatus or installation for the receipt or transmission of messages by wireless telegraphy without the licence in writing of the Governor, and under such terms and conditions as may be prescribed in such licence, which licence the Governor may in his discretion at any time cancel and revoke.

3. It shall be lawful for the Governor by order in writing to authorise the Chief of Police or any other person named by him in such order to enter at any time by day or night and by force, if

necessary, any premises or place [*or any ship*] in Gibraltar, and to search for any such apparatus or installation as described in this Ordinance, and to seize and remove the same to be dealt with in such manner as the Governor may direct.

4. Any person offending against this Ordinance, or resisting or in any way interfering with any person charged with the execution of an order issued by the Governor under the preceding section, may be arrested without warrant and shall be liable on conviction by a Court of Summary Jurisdiction to a penalty not exceeding £50, or to imprisonment with or without hard labour for any term not exceeding three months.

5. All penalties under this Ordinance shall be recoverable summarily in manner directed by "The Justices Ordinance, Gibraltar, 1890."

THE "Wireless Telegraph Apparatus Further Amendment Ordinance, Gibraltar, 1909" (April 30th), contains the following clause:

2. A person shall not work any apparatus for wireless telegraphy installed on merchant ships, whether British or foreign, while in Gibraltar, otherwise than in accordance with rules made in that behalf by the Governor, and the Governor may, by any such rules, impose penalties recoverable summarily for the breach of any such rules, not exceeding ten pounds for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ships. All such rules shall be published in the Official Gazette and after such publication shall have the same force and effect as if enacted in this Ordinance.

THE following Rules as to the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in Gibraltar, were made on May 3rd, 1909, under "The Wireless Telegraph Apparatus Further Amendment Ordinance, Gibraltar, 1909":

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of Gibraltar shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in Gibraltar or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of

Gibraltar, except with the special or general permission in writing of the Governor.

3. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These rules shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

5. Any person offending against any of these rules shall be liable to a penalty not exceeding ten pounds for each offence recoverable summarily under "The Justices Ordinance, Gibraltar, 1890" and any apparatus for wireless telegraphy installed or worked on such ship may be forfeited to His Majesty.

GOLD COAST COLONY

An Ordinance to regulate communication by Wireless Telegraphy was issued on September 22nd, 1913:—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1903."

2. No person shall establish or use any apparatus or installation for the purpose of communication by wireless telegraphy without a licence from the Governor. Any such licence may be granted on such terms and conditions as the Governor may prescribe.

3. Any person who shall contravene the provisions of the preceding section or any of the terms or conditions of any licence granted hereunder shall be guilty of an offence and shall on conviction before a District Commissioner be liable to a penalty not exceeding £100 or to imprisonment with or without hard labour for a period not exceeding six months or to both, and the apparatus or installation in respect of which the offence is committed shall be forfeited to His Majesty.

4. The Governor in Council may from time to time make, revoke or alter rules for further or better carrying into effect any of the purposes of this Ordinance, and such rules shall on publication in the "Gazette" have the same effect as if enacted in this Ordinance.

The following Bill, which has been read a first time at a meeting of the Legislative Council held at the Public Offices,

Victoriaborg, Accra, on Wendesday, August 6th, 1913, is published for general information:—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "wireless telegraphy" means any system of communication by telegraphy without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or install or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the Colonial waters otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the "Gazette" have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the Colonial waters shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate or District Commissioner is satisfied by information on oath that there is reasonable ground for suspecting THAT A WIRELESS telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the Commissioner of Police and

he warrant, and a warrant so granted shall authorise the er or person named therein to enter and inspect the station, ip, and to seize any apparatus which appears to him to be nded to be used for wireless telegraphy therein.

ny person who shall offend against any provision of this or any of the regulations made thereunder shall be liable conviction for every such offence to a fine not exceeding , and upon such conviction the Court may order that any or wireless telegraphy in connection with which the offence ted shall be seized and forfeited.

ceedings shall be taken before a District Commissioner's e complaint of a Commissioner of Police or of any person orised by him in writing, and the procedure shall be the procedure for the time being in force in respect of offences on summary conviction.

Wireless Telegraphy Ordinance, 1903, and the Wireless (Amendment) Ordinance, 1913, are hereby repealed.

SCHEDULE—Section 5 (2).

Regulations.

pparatus for wireless telegraphy on board a merchant ship ial waters shall be worked in such a way as not to interfere

Naval signalling; or

The working of any wireless telegraph station lawfully ed, installed, or worked in the Colony or Colonial waters, particular the said apparatus shall be so worked as not to t or interfere with the transmission of any messages wireless telegraph stations established as aforesaid on land eless telegraph stations established on ships at sea.

these Regulations "Naval Signalling" means signalling any system of wireless telegraphy between two or more Majesty's Navy, between ships of His Majesty's Navy and ns, or between a ship of His Majesty's Navy or a Naval any other wireless telegraph station, whether on shore or

apparatus for wireless telegraphy on board a merchant worked or used while such ship is in any harbour, port, e Colony except with the special or general permission of r.

the purpose of any proceedings under these regulations or person being or appearing to be in command or charge shall be deemed to have authorised and to be responsible or working of any apparatus on board such ship.

y summons or other document in any proceedings under

these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

(vi.) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

GREAT BRITAIN

FOLLOWING the termination of the meeting of the delegates at the International Conference in Berlin in 1903, the British Government drafted a Wireless Telegraphy Act to define the official position of the Postal and Telegraph Department in the United Kingdom in regard to the new development. The Act received Royal assent on August 15th, 1904, and the text is as follows :—

Wireless Telegraphy Act, 1904.

1.—(1) A person shall not establish any wireless telegraph station, or instal or work any apparatus for wireless telegraphy, in any place or on board any British ship except under and in accordance with a licence granted in that behalf by the Postmaster-General.

(2) Every such licence shall be in such form and for such period as the Postmaster-General may determine, and shall contain the terms, conditions, and restrictions on and subject to which the licence is granted, and any such licence may include two or more stations, places, or ships.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour, and be liable, on conviction under the Summary Jurisdiction Acts, to a penalty not exceeding ten pounds, and on conviction on indictment to a fine not exceeding one hundred pounds, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade.

(4) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within his jurisdiction without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade, and

named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) Sections 684, 685, and 686 of the Merchant Shipping Act, 1894 (which relate to the jurisdiction of courts and justices), and section 693 of the same Act (which relates to distress for sums ordered to be paid by masters and owners of ships), shall apply to the jurisdiction of courts and justices in respect of ships, and to distress under this Act.

(6) The Postmaster-General may make regulations for prescribing the form and manner in which applications for licences under this Act are to be made, and, with the consent of the Treasury, the fees payable on the grant of any such licence.

(7) The expression "wireless telegraphy" means any system of communication by telegraph as defined in the Telegraph Acts, 1863 to 1904, without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: Provided that nothing in this Act shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

2.—(1) Where the applicant for a licence proves to the satisfaction of the Postmaster-General that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted, subject to such special terms, conditions, and restrictions as the Postmaster-General may think proper, but shall not be subject to any rent or royalty.

(2) Where an applicant for a licence satisfies the Postmaster-General that a wireless telegraph station is to be used solely for the transmission of telegrams which are within the first or second exception from the exclusive privilege of transmitting telegrams conferred upon the Postmaster-General by the Telegraph Act, 1869, a licence for that purpose, if granted, shall not be subject to any rent or royalty.

(3) It shall be lawful for the Postmaster-General, due regard being had to the maintenance and exercise of effective control over wireless telegraphy, to grant special licences at reduced terms for the establishment and working of wireless telegraph stations to be used exclusively for the transmission within the United Kingdom of news to public registered newspapers. A schedule of all reduced rents or royalties imposed by any special licences shall be laid before both Houses of Parliament within fourteen days of the commencement of the session next succeeding the grant of any such licences.

3.—(1) This Act may be cited as the Wireless Telegraphy Act, 1904, and may be cited with the Telegraph Acts, 1863 to 1904.

(2) This Act shall extend to the whole of the British Islands and

to all British ships in the territorial waters abutting on the coast of the British Islands, and the Royal Courts of the Channel Islands shall register this Act accordingly.

(3) His Majesty in Council may order that this Act shall, subject to any conditions, exceptions, and qualifications contained in the order, apply during the continuance of the order to British ships whilst on the high seas.

(4) A person shall not work any apparatus for wireless telegraphy installed on a foreign ship whilst that ship is in territorial waters otherwise than in accordance with regulations made in that behalf by the Postmaster-General, and the Postmaster-General may, by any such regulations, impose penalties recoverable summarily for the breach of any such regulations not exceeding ten pounds for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship. Save as aforesaid, nothing in this Act shall apply to the working of apparatus for wireless telegraphy installed on any foreign ship.

4.—In the application of this Act to Scotland the expression "Misdemeanour" means crime and offence.

5.—In the application of this Act to the Channel Islands and the Isle of Man—

(1) The Lieutenant-Governor of the Island of Jersey or the Island of Guernsey, and the Governor, Lieutenant-Governor, or Deputy Governor of the Isle of Man, as the case may require, shall be substituted for the Board of Trade.

(2) Offences may be prosecuted, fines recovered, proceedings taken, and search warrants issued in such courts and in such manner as may for the time being be provided in the Channel Islands and the Isle of Man by law, or if no express provision is made then in and before the courts and in the manner in which the like offences, fines, proceedings, and warrants may be prosecuted, recovered, taken, or issued therein by law, or as near thereto as circumstances admit, and the bailiff or his lieutenant, or any Jurat of the Royal Court in the Island of Jersey or the Island of Guernsey, and the high bailiff or two justices of the peace in the Isle of Man, shall respectively be substituted for a justice of the peace.

6. This Act shall continue in force until the thirty-first day of July, nineteen hundred and six (*now the 31st day of December,* 1912), and no longer, unless Parliament otherwise determines. (It has now been extended indefinitely by the Expiring Laws Continuance Act.)

THE following Order in Council is dated 29th February, 1908:—

(1) The Wireless Telegraphy Act, 1904, shall apply to British ships whilst on the high seas, provided that a person on board a British ship which is registered in any British possession (other than the

Channel Islands and the Isle of Man), or in any British Protectorate shall not be deemed to commit an offence against the Wireless Telegraphy Act, 1904, by reason of the installation or working of wireless telegraphy on such ship if the authority in such Possession or Protectorate, having power by law so to do, shall have granted a licence for the installation and working of apparatus for wireless telegraphy on that ship, and if such person is acting in accordance with the provisions of such licence.

(2) The Interpretation Act, 1889, shall apply for the purpose of the interpretation of this Order as it applies for the purpose of the interpretation of an Act of Parliament.

(3) This Order shall be published in the *London Gazette*, and shall come into operation immediately from and after the expiration of three months after this Order is so published.

(4) This Order may be cited as "The Wireless Telegraphy Order, 1908."

AN Order was issued in 1908 (No. 496) containing regulations relating to foreign ships :—

1. In these Regulations unless the context otherwise requires—

"Wireless Telegraphy" has the same meaning as in the Wireless Telegraphy Act, 1904.

"Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

"Territorial Waters" means such part of the sea adjacent to the coast of the British Islands as is deemed by international law to be within the territorial sovereignty of His Majesty, and includes harbours.

"Harbour" includes harbours properly so called, whether natural or artificial estuaries, navigable rivers, piers, jetties, and other works in or at which ships can obtain shelter, or ship and unship goods or passengers.

2. When communications are made by means of wireless telegraphy between a foreign ship in territorial waters and a wireless telegraph station in the British Islands, the rules in force for the working of wireless telegraphy at that station shall be observed.

3. All apparatus for wireless telegraphy on board a foreign ship in territorial waters shall be worked in such a way as not to interrupt or interfere with—

(*a*) Naval Signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the British Islands or the territorial waters abutting on the coast of the British Islands,

and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. (1) Except with the special permission in writing of the Postmaster-General no apparatus for wireless telegraphy on board a foreign ship (other than a ship of war) shall be worked or used whilst such ship is in any harbour in the British Islands.

(2) Without prejudice to the operation of the general provisions of these Regulations, the use of wireless telegraphy on board a foreign ship of war while in a harbour in the British Islands shall be subject to such rules (whether prohibitive or regulative) as may be made by the Admiralty from time to time.

5. (1) If at any time in the opinion of one of His Majesty's Principal Secretaries of State an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, and notice to that effect is published by the Postmaster-General, after the publication of such notice and until further notice the use of wireless telegraphy on board foreign ships whilst in territorial waters shall be subject to such rules as may be made by the Admiralty from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

(2) Such notice as aforesaid shall be published in the *London Gazette*, the *Edinburgh Gazette*, and the *Dublin Gazette*, and in such other manner, if any, as to the Postmaster-General may seem fit.

6. (1) Any person who shall offend against any provision of these Regulations or of any Rules made by the Admiralty thereunder shall be liable on conviction under the Summary Jurisdiction Acts for every such offence to a penalty not exceeding ten pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy installed or worked on board the ship on which the offence was committed shall be seized and forfeited.

(2) For the purposes of any proceedings under these Regulations the master or person being or appearing to be in command or charge of any Foreign ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(3) Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

7. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

8. These Regulations shall come into operation on the first day of July, 1908.

9. These Regulations may be cited as "The Wireless Telegraphy (Foreign Ships) Regulations, 1908."

THE following is a copy of the form of Licence granted by the Postmaster-General to establish Wireless Telegraph Ship Stations:—

LICENCE TO ESTABLISH WIRELESS TELEGRAPH SHIP STATIONS.

Whereas —— —— of —— —— in the County of —— —— (hereinafter called "the Licensee") is desirous of establishing installing working and using on a ship or ships belonging to the Licensee wireless telegraphy as defined in section 1 (7) of the Wireless Telegraphy Act 1904:

And whereas by reason of the provisions of the Telegraph Acts 1863 to 191 and the Wireless Telegraphy Order 1908 it is unlawful to establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship (whether in the territorial waters of the British Islands or on the high seas) except under and in accordance with a licence granted in that behalf by the Postmaster-General:

And whereas at the request of the Licensee I have agreed to grant to the Licensee the licences powers and authorities hereinafter expressed and contained for the period upon the terms and subject to the stipulations and conditions hereinafter appearing:

Now I the above-named —— —— His Majesty's Postmaster-General in exercise of all powers and authorities enabling me in this behalf do hereby grant to the Licensee during the term or period commencing on the day of the date hereof and terminating on the 31st day of December 1913 and thereafter so long as the Wireless Telegraphy Act 1904 shall continue in force unless and until these presents and the licence or permission hereby given shall be determined as hereinafter provided license and permission—

(i) To establish instal and work for the purposes hereinafter mentioned at the ship station or stations specified in the Schedule hereto apparatus for wireless telegraphy of the kind specified in the Schedule hereto (which apparatus is hereinafter referred to as "the licensed apparatus"):

Provided that—

(a) Each ship station shall be of such class mentioned in Articles XIII. of the Service Regulations annexed to the Radiotelegraph Convention 1912 as is specified in the said Schedule opposite to the name of such station;

(b) The apparatus installed at each ship station shall be of the character specified in the said Schedule opposite to the name of such station;

(*c*) The transmitting apparatus used at each ship station shall be of such a character that the waves emitted are as pure and as little damped as possible and the receiving apparatus used at the said station or stations shall be of such a character as to afford the greatest possible protection from disturbance during the reception of signals;

(*d*) The apparatus shall include such emergency installation as may be required according to the class of the ship station under the provisions of Article XI. of the Service Regulations annexed to the Radiotelegraph Convention 1912;

(*e*) The licensed apparatus shall be so constructed as to be capable of using wave-lengths of 600 and 300 metres in length as measured by the standard of measurement in use by the Post Office for the time being and such other wave-lengths not exceeding 600 metres in length as shall be authorised in writing from time to time by the Postmaster-General. Provided always that the wave-length of 600 metres shall normally be used for communication and further that the wave-length of 1,800 metres may be used for transmission in the exceptional case contemplated by Article XXXV. (2) (*a*) of the Service Regulations annexed to the Radiotelegraph Convention 1912:

Provided further that only the wave-length of 600 metres shall be used by the Licensee during the period of any war in which the United Kingdom is engaged;

(*f*) The apparatus shall admit of the transmission and reception of messages at the rate of not less than 20 words a minute five letters being counted as one word;

(ii) To transmit and receive messages by means of the licensed apparatus between the said ship stations and also between the said ship stations and coast stations and other ship stations. Provided that the Licensee shall not except with the consent in writing of the Postmaster-General transmit or receive messages from and at the said ship stations when in any harbour in the British Islands; and

(iii) To receive money or other valuable consideration for or in respect of the use of the licensed apparatus or for or in respect of the transmission or receipt of messages by means of the said apparatus.

And I do hereby declare that the said licence and permission is granted on and subject to the following conditions and provisions:

1. In these presents (and in the Schedule hereto) the following words and expressions shall have the several meanings hereinafter

assigned to them unless there be something either in the subject or context repugnant to such construction (that is to say) :—

The expression "the Postmaster-General" means the Postmaster-General for the time being.

The expression "wireless telegraphy" has the same meaning as in the Wireless Telegraphy Act, 1904.

The term "telegraph" has the same meaning as in the Telegraph Act, 1869.

The expression "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy between ships of His Majesty's Navy and Naval Stations or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether a coast station or a ship station.

The expression "the Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

The expressions "the International Telegraph Convention" and "the International Telegraph Regulations" mean respectively the International Convention of St. Petersburg dated the 10th-22nd July, 1875, and the Service Regulations made thereunder and include respectively any modifications of the Convention or Regulations made from time to time.

The expression "the Radiotelegraph Convention, 1912," means the Convention signed at London on the 5th day of July, 1912, and the Service Regulations made thereunder and includes any modification of the Convention or Regulations made from time to time.

The expression "coast station" means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

The term "ship station" means a wireless telegraph station established on board a ship which is not permanently moored.

2. The licensed apparatus shall not be used by the Licensee or by any other person either on behalf or by permission of the Licensee for the transmission or receipt of messages except messages authorised by this licence.

3. (1) The Licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with Naval signalling.

(2) If the Admiralty are of opinion that the working of the licensed apparatus at any ship station specified in the Schedule hereto or in any such Supplemental Licence as aforesaid is inconsistent with the free use of Naval signalling the Licensee shall when required in writing by the Postmaster-General so to do close the said station.

(3) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of this licence.

4. For the purpose of this licence the Licensee shall observe the International Telegraph Convention and the International Telegraph Regulations so far as the said Convention and Regulations are capable of being applied to wireless telegraphy in common with ordinary land and submarine telegraphy.

5. The Licensee shall observe the provisions of any Regulations from time to time under the provisions of the Telegraph Acts, 1863 to 191 , by the Postmaster-General with the consent of the Treasury in relation to the conduct of wireless telegraph business so far as the same are applicable to the Licensee.

6. The Licensee shall observe the provisions of the Radiotelegraphic Convention, 1912.

7. The Licensee shall comply with all such directions and observe all such rules as may be given or made by the Postmaster-General from time to time for the purpose of preventing interference with the working of any other wireless telegraph station and for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station.

8. The licensed apparatus shall not without the consent of the Postmaster-General be altered or modified in respect of any of the particulars mentioned in the Schedule hereto.

9. The Licensee shall at all times indemnify the Postmaster-General against all actions claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

10. (1) Subject to the provisions of this licence the Licensee shall transmit messages by means of the licensed apparatus on equal terms without favour or preference whether as regards rates of charge order of transmission or otherwise. Provided always that signals of distress and messages in connection therewith shall receive priority over all other messages and that the order of transmission of such other messages shall be governed by the International Telegraph Regulations.

(2) In respect of messages transmitted on behalf of His Majesty's Government the Licensee shall charge rates not in excess of half of the rates charged to the ordinary public.

11. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and shall answer such requests and signals and re-transmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

12. (1) The licensed apparatus at each of the ship stations mentioned in the Schedule hereto shall be worked only by operators holding

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Minister of Marine, Posts and Telegraphs, Belgium.

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certificates issued by the Postmaster-General and the Licensee shall provide for the working of each station such operators as are required by the provisions of Article X. of the Service Regulations annexed to the Radiotelegraph Convention 1912 according to the class of the ship station and shall observe the regulations as to the working of the ship station laid down according to its class by Article XIII. of the said Regulations.

(2) A certificate shall not be recognised as authorising the holder to work a ship station under the terms of this licence unless it bears a statement that it is issued by the Postmaster-General in accordance with the Radiotelegraph Convention 1912. Such certificates will be valid only during the operation of the said Convention. They will be granted to persons of such technical proficiency and will be in such form and will be subject to such conditions as the Postmaster-General shall from time to time prescribe and they may be endorsed or withdrawn at the discretion of the Postmaster-General in case of misconduct or breach on the part of the holder of the regulations prescribed for the working of ship stations.

13. The Licensee shall not divulge to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and not intended for receipt by means of the licensed apparatus. The Licensee shall exhibit at each of the ship stations specified in the Schedule hereto a copy of Section 11 of the Post Office (Protection) Act 1884 and any contravention of that section by any person in the employment of the Licensee shall be deemed to be a breach of the provisions of this licence entitling the Postmaster-General under Clause 22 hereof to revoke and determine this Licence.

14. The Licensee shall keep full accounts records and registers of all messages transmitted by means of the licensed apparatus and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and of ultimate destination and such further particulars as the Postmaster-General shall from time to time reasonably require to be shown messages on His Majesty's service being in such registers distinguished from other messages. The Licensee shall preserve all used message forms written and printed and transcripts of messages and all other papers for a period of at least fifteen months counting from the month following that in which the radiotelegrams were handed in as prescribed by the Radiotelegraph Convention, 1912, and such registers and message papers shall be open to the inspection of the Postmaster-General or his officers thereto authorised at the —— —— —— Office of the Licensee for the time being or at such other place as may be agreed between the hours of 10 a.m. and 5 p.m. on every day except Sunday or a statute or general holiday.

15. The Licensee shall render to the Postmaster-General such accounts as the Postmaster-General shall direct in respect of all charges due or payable under the Radiotelegraph Convention 1912 in respect of messages exchanged between the ship stations hereby licensed and coast stations and shall pay to the Postmaster-General at such times and in such manner as the Postmaster-General shall direct all sums which shall be due from the Licensee under such accounts.

16. The Postmaster-General and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the ship stations hereby licensed for the purpose of inspecting and may inspect any apparatus fixed or being in such stations respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations respectively and the working and user of such apparatus and telegraphic instruments respectively.

17. The Licensee shall carry on every ship on which a ship station is established under the licence a print or copy of the licence certified under the hand of an appropriate officer of the Postmaster-General to be a true copy and also such documents as may be prescribed by the Postmaster-General for the purpose of enabling the Licensee to communicate with coast stations in accordance with the Radiotelegraph Covention, 1912.

18. The Licensee shall pay to the Postmaster-General for and in respect of the licence hereby granted a royalty of five shillings per annum in respect of each ship station at which the licensed apparatus is installed.

(1) The Licensee shall pay to the Postmaster-General for and in respect of the Licence hereby granted a royalty of five shillings per annum in respect of each ship station in which the licensed apparatus is installed.

(2) The said royalty shall be payable on the 1st of December in each year during which the licence remains valid.

19. Except with the consent in writing of the Postmaster-General the Licensee shall not assign, underlet, or otherwise dispose of or admit any other person or body to participate in the benefit of the licences powers or authorities hereby granted or any of such licenses powers or authorities.

20. (1) If and whenever an emergency shall have arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for any naval, military customs or police officer to take possession of the licensed apparatus or any part thereof in the name and on behalf of His Majesty and to use the same for His Majesty's service and in that event any such officer or person so authorised may enter upon any ship on which any such apparatus is

installed and take possession of the said apparatus and use the same as aforesaid, and subject to such use may use the same or allow it to be used for such ordinary services as may in his discretion seem fit to him or may prohibit and take steps to prevent the use of the same and issue directions which shall be obeyed by the Licensee to prevent such use.

(2) Any such officer may in such event as aforesaid instead of taking possession of the licensed apparatus as aforesaid direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus either wholly or partly and in such manner as he may direct and such persons may enter upon any ship on which any apparatus is installed accordingly or the said officer may direct the Licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said officer may prescribe and the Licensee shall obey and conform to all such directions.

(3) The Licensee shall be entitled to reasonable compensation for any damage to the licensed apparatus arising in consequence of the exercise of the powers conferred by this Clause.

21. At any time after the 31st day of December 1913 the Postmaster-General may in his absolute discretion give notice in writing to determine these presents and the licence or permission hereby granted at the end of one calendar month from the date of such notice and at the expiration of that period the licence or permission hereby granted shall cease and determine accordingly but without prejudice to any remedy of the Postmaster-General under any condition or provision herein contained.

22. In any of the following cases (that is to say) :—

(*a*) In case any sum of money which ought to be paid by the Licensee to the Postmaster-General under or by virtue of these presents shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the provisions herein contained; or

(*b*) In case of any breach non-observance or non-performance by or on the part of the Licensee of any of the provisions (other than a provision for the payment of money) or conditions herein contained

then and in any such case the Postmaster-General may by notice in writing under his seal revoke and determine these presents and the licences powers and authorities hereinbefore granted and each and every of them as to all or any of the ship stations hereby licensed and thereupon these presents and the said licences powers and authorities and each and every of them shall absolutely cease determine and become

void as to all or any of the said ship stations (as the case may be) but without prejudice to any right of action or remedy which shall have accrued or shall thereafter accrue to the Postmaster-General under any condition or provision herein contained.

23. Nothing in these presents contained shall prejudice or affect the right of the Postmaster-General from time to time to establish extend maintain and work any system or systems of telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit neither shall anything herein contained prejudice or affect the right of the Postmaster-General from time to time to enter into agreements for or to grant licences relative to the working and user of telegraphs (whether of a like nature to those hereby licensed or otherwise) or the transmission of messages in any part of the United Kingdom by means of wireless telegraphy or by any other means with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit. And (save as in this licence expressly provided) nothing herein contained shall be deemed to authorise the Licensee to exercise any of the powers or authorities conferred on or acquired by the Postmaster-General by or under the Telegraph Aots or any of them.

24. Any notice, request, or consent (whether expressed to be in writing or not) to be given by the Postmaster-General under these presents may be under the hand of any one of the secretaries or assistant secretaries for the time being of the Post Office and may be served by sending the same in a registered letter addressed to the Licensee at the —— —— office for the time being of the Licensee or if such notice request or consent relates to any particular ship station by delivery to the master of the ship upon which such station is installed and any notice to be given by the Licensee under these presents may be served by sending the same in a registered letter addressed to the Secretary of the Post Office at the General Post Office, London.

The Schedule of Ship Stations before referred to.

1.	2.	3.	4.	Normal Range of Signalling in Nautical Miles.		Character of Apparatus.		9. Power.		10.
Name of Ship on which Station established.	Class of Ship Station under the Radiotelegraph Convention 1912.	Nature of Services performed.	Hours of Service.	5. By Night.	6. By Day.	7. System of Radio-telegraphy with the Characteristics of the System of Emission.	8. Wave lengths (in Metres).	Source and Maximum Output.	Maxim. to be taken by Transmitting Instruments	If Alternator is used, Number of Cycles per Second.

COMMERCIAL COAST STATION LICENCE.

This is substantially the same as the Ship Station licence (p. 173), except in the following details :—

The licence authorises the Licensee—

(i.) To establish, instal and work for the purposes hereinafter mentioned at the coast stations specified in the Schedule hereto, apparatus for wireless telegraphy of the kind used in the system known as the system of wireless telegraphy (which apparatus is hereinafter referred to as "the licensed apparatus") provided that (*a*) the apparatus installed at each station and the wave-lengths used thereat shall be of the character and length respectively specified in the said Schedule opposite to the name of such station; and (*b*) the Postmaster-General may for the purpose of facilitating communication by wireless telegraphy require the use at any of the said stations of wave-lengths other than and in addition to or in substitution for those specified as aforesaid in the said Schedule; (*c*) the apparatus used at all of the said stations shall be syntonised.

(ii.) To transmit and receive ship and coast messages by means of the licensed apparatus.

(iii.) To transmit and receive by means of the licensed apparatus between any one of the said stations and another messages incidental to the message hereinbefore authorised, but no other messages.

(iv.) To receive money or other valuable consideration for or in respect of the use of the licensed apparatus or for or in respect of the transmission or receipt of ship and coast messages by means of the said apparatus.

The licence is granted on and subject to the following conditions and provisions :—

1. In these presents the following words and expressions shall have their several meanings hereinafter assigned to them.

The expression "Coast Station" means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between land and ships at sea.

The expression "ship and coast messages" means messages exchanged between ship and coast stations.

7. The Licensee shall so work the licensed apparatus as not to interfere with the working of any wireless telegraph station established in the British Islands, or in territorial waters abutting on the coasts of the British Islands by or for the purposes of the Postmaster-General, or any other department of H.M. Government, or for commercial purposes, and, in particular, with the transmission or receipt of any ship and coast messages.

10. Subject to the provisions of this licence the Licensee shall

transmit messages by means of the licensed apparatus on equal terms without favour or preference, whether as regards rates of charge, order of transmission or otherwise.

11.—(1) If and whenever any department of His Majesty's Government shall require the Licensee, his servants or agents to transmit by means of the licensed apparatus any message on His Majesty's service (including messages to and from ships of His Majesty's Navy) such messages shall have priority over all other messages, and the Licensee shall, as soon as reasonably may be, transmit the same, and shall, until, and in so far as may be necessary to effect such transmission, suspend the transmission of all other messages.

(2) The Licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

(3) In respect of messages transmitted on behalf of His Majesty's Government, the Licensee shall charge rates not in excess of half of the rates charged to the ordinary public.

14. The Licensee shall employ British subjects only at the said coast stations.

17. The Licensee shall render to the Postmaster-General such accounts as the Postmaster-General shall direct in respect of all charges due or payable under the Radiotelegraph Convention, in respect of ship and coast messages, and shall pay to the Postmaster-General at such times and in such manner as the Postmaster-General shall direct, all sums which shall be due from the Licensee under such accounts.

22. This is substantially the same as clause 20 of the ship station licence, but "one of His Majesty's principal Secretaries of State" has been substituted for "any officer in command of His Majesty's ships of war" in sub-sections (1) and (2).

23. The licence shall be determined—

(*a*) In case no station shall be established under these presents within from the date of these presents or having been established any station shall at any time cease to be duly maintained by the Licensee for a period of continuously.

(*b*) In case any sum of money which ought to be paid by the Licensee to the Postmaster-General, under or by virtue of these presents. shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the covenants herein contained, or

(*c*) In case of any breach, non-observance or non-performance by or on the part of the Licensee of any of the provisions (other than a provision for the payment of money) or conditions herein contained.

25. All matters which in pursuance of the provisions herein contained are to be determined by arbitration shall be referred to arbitration in accordance with the provisions of the Arbitration Act, 1889, or any then subsisting statutory re-enactment or modification thereof.

The Schedule of Coast Stations before referred to.

1	Normal range of signalling.		Character of apparatus.		Power.	
Name of coast station.	2 By night.	3 By day	4 Description of receiving apparatus.[1]	5 Wave-length (in metres).	6 Source and maximum output.	Maximum to be taken by transmitting instruments

Licence to Use Wireless Telegraphy for Experimental Purposes.

(Sending and Receiving.—Form 1.)

I, the above-named —— ——, His Majesty's Postmaster-General in exercise of all powers and authorities enabling me in this behalf do hereby grant to the Licensee licence and permission for the period and determinable as hereinafter provided—

(i.) to establish instal and work at the stations specified in Part I. of the Schedule hereto apparatus for wireless telegraphy (hereinafter called "the licensed apparatus") provided that the apparatus installed at each station shall be of the character specified in such Part of the said Schedule opposite to the name of such station;

(ii.) to send messages by means of the licensed apparatus from the said stations to the stations specified in Part II. of the said Schedule; and

(iii.) to receive messages by means of the licensed apparatus:

Provided that the licensed apparatus shall be worked and messages shall be sent and received solely for the purpose of conducting experiments in wireless telegraphy and for no other purpose whatever;

I do hereby declare that the said licence and permission is granted on and subject to the following conditions and provisions:—

1. In these presents (and in the Schedule hereto) apparatus shall be deemed to be "syntonised" when the sending apparatus is so adjusted as to communicate with a receiver which has a corresponding adjustment and to produce as little effect as possible on a receiver not having a corresponding adjustment.

2. The licensed apparatus shall not be used by the Licensee or by any person either on behalf or by permission of the Licensee for any purpose except for the purpose of conducting experiments in wireless telegraphy.

3.—(1) The Licensee shall not by the transmission of any message

by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with naval signalling.

(2) Whenever the operators at any signal station of the Licensee perceive through the medium of the instruments used by them that naval signalling is proceeding they shall refrain from using the licensed apparatus until all indication that naval signalling is proceeding shall have ceased.

(3) The Licensee shall if so required in writing by the Admiralty cease to use the licensed apparatus for such period (not exceeding two hours in any one day) as may be specified by the Admiralty.

(4) If the Admiralty are of opinion that the working of the licensed apparatus at any station specified in the Schedule hereto is inconsistent with the free use of naval signalling the Licensee shall when required in writing by the Postmaster-General close the said station.

(5) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of this Licence.

4. The Licensee shall observe the provisions of any Regulations from time to time made under the provisions of the Telegraph Acts 1863 to 191   by the Postmaster-General with the consent of the Treasury in relation to the conduct of wireless telegraph business.

5.—(1) The Licensee shall so work the licensed apparatus as not to interfere with the working of any wireless telegraph station established in the British Islands or the territorial waters abutting on the coasts of the British Islands (whether on shore or on any ship) by or for the purposes of the Postmaster-General or any Department of His Majesty's Government or for commercial purposes and in particular with the sending or receipt of any messages between or at wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) With a view to preventing such interference as aforesaid the Licensee shall comply with all directions which shall be given to the Licensee by the Postmaster-General and with all rules prescribed by the Postmaster-General for observance by his Licensees—

(*a*) With respect to all arrangements to be adopted for the purpose of securing syntonised apparatus or for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station;

(*b*) With respect to any alteration of messages which the Postmaster-General may think necessary; and

(*c*) Generally with respect to avoiding interference between one wireless telegraph station and another.

6. The licensed apparatus shall not without the consent in writing of the Postmaster-General be altered in respect of any of the particulars mentioned in the Schedule hereto.

7. The Licensee shall at all times indemnify the Postmaster-General against all actions claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

8. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and send them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

9. The Licensee shall not divulge to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and not intended for receipt by means of the licensed apparatus.

10. The Postmaster-General and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the stations or other premises in the possession or occupation of the Licensee either solely or jointly with any other person or persons for the purpose of inspecting and may inspect any apparatus fixed or being in such places respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such places respectively and the working and user of such apparatus and telegraphic instruments respectively.

11.—(1) All apparatus used or intended to be used by the Licensee under this licence shall be so erected fixed placed and used as not either directly or by reason of the working or user thereof to interfere with the efficient or convenient maintenance working or user of any telegraphic line of the Postmaster-General which may from time to time exist or which it is probable that the Postmaster-General may have occasion to erect place fix or use or to expose any such line to risk of damage or to risk of interference with the efficient or convenient working or user thereof.

(2) In case any telegraphic line of the Postmaster-General shall be damaged or the efficient working or user thereof shall be wholly or partially interrupted or otherwise interfered with and the Engineer-in-Chief for the time being of the Post Office shall certify in writing under his hand that such damage interruption or interference has been caused directly or indirectly by any apparatus used or intended to be used by the Licensee or by anything done by or on behalf of the Licensee in relation thereto the Licensee shall on demand pay to the Postmaster-General all costs that shall be reasonably incurred by him in repairing such damage and in removing or altering such telegraphic line so as to

restore the same to efficient working order and in adding thereto or substituting therefor either temporarily or permanently any other telegraphic line if the said Engineer-in-Chief shall certify that such addition or substitution is reasonably required.

(3) For the purposes of this Article the expression "telegraphic line" has the same meaning as in the Telegraph Act 1878 and the expression "telegraphic line of the Postmaster-General" includes a telegraphic line belonging to or worked by the Postmaster-General or constructed or maintained by him for any Department of the Government or other body or person.

12. Except with the consent in writing of the Postmaster-General the Licensee shall not assign underlet or otherwise dispose of or admit any other person or body to participate in the benefit of the licences powers or authorities hereby granted or any of such licences powers or authorities.

13. If and whenever in the opinion of the Postmaster-General an emergency shall have arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for any person authorised by an instrument in writing under the hand of the Postmaster-General to cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and in that event any person so authorised may enter upon the stations specified in Part I. of the Schedule hereto or any of them and take possession thereof and use the same as aforesaid.

14. The Postmaster-General may at any time in his absolute discretion give notice in writing to determine these presents and the licence or permission hereby given at the end of one calendar month from the date of such notice and at the expiration of that period the licence or permission hereby granted shall cease and determine accordingly but without prejudice to any remedy of the Postmaster-General under any condition or provision herein contained. In the absence of any such notice as aforesaid these presents and the licence or permission hereby given shall have effect only so long as the Wireless Telegraphy Act 1904 shall continue in force.

15. In case of any breach non-observance or non-performance by or on the part of the Licensee of any of the conditions or provisions herein contained the Postmaster-General may by writing under his seal revoke and determine these presents and the licences powers and authorities hereinbefore granted and each and every of them and thereupon these presents and the said licences powers and authorities and each and every of them shall absolutely cease determine and become void:

Provided always that no such revocation or determination as afore-

said shall prejudice or affect any right of action or remedy of the Postmaster-General under any condition or provision herein contained.

Clauses 16 and 17 are similar to Clauses 23 and 24 Ship Station Licence.

The SCHEDULE before referred to.

PART I.

1. Name of Station.	2. Wave-lengths (in metres.)	3. Power.	
		Source and Maximum Output.	Maximum to be taken by sending instruments.

LICENCE TO USE WIRELESS TELEGRAPHY FOR EXPERIMENTAL PURPOSES.

(Receiving Only.)—Form IV.

Now I the above-named —— —— His Majesty's Postmaster-General in exercise of all powers and authorities enabling me in this behalf do hereby grant to the Licensee licence and permission for the period and determinable as hereinafter provided—

To establish instal and work apparatus for wireless telegraphy (hereinafter called "the licensed apparatus") at —— —— (hereinafter called "the said station"):

Provided that the licensed apparatus shall be worked as a receiving station only and used solely for the purpose of conducting experiments in wireless telegraphy and for no other purpose whatever;

I do hereby declare that the said licence and permission is granted on and subject to the following conditions and provisions:—

2. The licensed apparatus shall not be used by the Licensee or by any person either on behalf or by permission of the Licensee for any purpose except for the purpose of conducting experiments in wireless telegraphy.

3. The Licensee shall observe the provisions of any Regulations from time to time made under the provisions of the Telegraph Acts 1863 to 191 by the Postmaster-General with the consent of the Treasury in relation to the conduct of wireless telegraph business.

4. The Licensee shall at all times indemnify the Postmaster-General against all actions claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

Clauses 5 to 8 are the same as Clauses 9 to 12 of the Sending and Receiving Licence.

9. If and whenever in the opinion of the Postmaster-General an emergency shall have arisen in which it is expedient for the public service that His Majesty's Government shall have control over the licensed apparatus it shall be lawful for any person authorised by an instrument in writing under the hand of the Postmaster-General to cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and in that event any person so authorised may enter upon the said station and take possession thereof and use the same as aforesaid.

Clause 10 as Clause 14 (Sending and Receiving Licence).

IN October, 1912, the Board of Trade, at the request of the Lords Commissioners of the Admiralty, issued a notice directing the attention of Masters and Owners of British Merchant Vessels to the necessity for arranging for periodical practices in Wireless Telegraphy communications between H.M. Ships of War and Ships of the British Mercantile Marine for the purpose of ensuring efficient and reliable communication when required.

The co-operation is invited of all British ship-owners and masters whose ships are fitted with Wireless Telegraphy, in order to give effect to the following proposals.

(1) At 8.30 a.m. and 2.30 p.m. daily any single man of war (destroyers and small craft excluded) or one man of war in a fleet in company, detailed by the Senior Naval Officer present, will adjust her Wireless Telegraphy transmitting and receiving apparatus to the commercial 600 metre wave length and make the call "CCCC," followed by her own commercial call sign, indicating that she is prepared to carry out an exercise with any British merchant ship within range.

On a British merchant ship receiving this call she will answer and say whether or not she is prepared to proceed with the exercise. Should more than one merchant ship answer, the man of war will indicate which is to exercise and which is to wait.

The exercise will then proceed, but no messages are to be exchanged which are not authorised by the respective captains and masters of the ships practising. No message received during such exercises is to be forwarded beyond the ship actually receiving the message and no payment for any message can be made. The exercises are to be considered as strictly on Service and not for any commercial advantage.

(2) In all such exercises the man of war is to be considered the controlling ship.

(3) The exercises will cease at 9.15 a.m. and 3.15 p.m. respectively, or before, at the discretion of the captains concerned.

(4) These exercises are only to be carried out between vessels, neither of which are within 150 miles range of any commercial shore station using the 600 metre wave length, and are to cease at once should one of H.M ships so direct.

GRENADA

THE WIRELESS TELEGRAPH ORDINANCE, 1903.

IN this Ordinance the term "Wireless Telegraphy" means any system or installation designed or constructed for the transmission or receipt of any messages or communications to or from a distant place by means of electric currents and signals generated by any apparatus or instrument which system, installation or instrument is unconnected by wire or other tangible attachment with such distant place. The term "Wireless Telegram" means any message or communication transmitted, or intended for transmission, by Wireless Telegraphy.

2. The Governor in Council and the servants of the Government of the Colony shall have the exclusive privilege of installing, erecting, maintaining, and using in this Colony apparatus intended for Wireless Telegraphy, and also the incidental services of transmitting, receiving, collecting or delivering Wireless Telegrams.

3. It shall not be lawful for any person to instal, erect, maintain or use in this Colony any apparatus or instrument for the purpose of Wireless Telegraphy without having previously obtained from the Governor a licence in that behalf to be granted on such terms and conditions as the Governor may prescribe.

4. Any person contravening the provisions of this Ordinance shall be liable on conviction to a fine not exceeding Fifty Pounds, and the apparatus and installation in respect of which a conviction is obtained may by order of the Magistrate before whom such conviction is obtained be forfeited to the use of His Majesty the King.

5. All proceedings under this Ordinance may be taken before the Magistrate of the Southern District or any other person appointed by the Governor for the purpose of hearing and deciding the case; and the mode of procedure shall be according to the law in force for the time being in respect of other offences punishable on summary conviction.

6. This Ordinance may be cited as "The Wireless Telegraph Ordinance."

HUNGARY

THE following is a copy of an Order issued by the Royal Hungarian President of the Board of Trade in 1912 in respect of wireless telegraphic equipments on Hungarian Ocean-going Passenger Ships.

In accordance with § § 24 and 27 of the appendix to my Order No. 60805, dated August 21st, 1912, concerning measures of safety for and equipment of sea-going merchant ships before they are allowed to be on active service: all passenger vessels which are already in active service, liners running to time-table from Hungarian ports further than Gibraltar or Aden carrying passengers, at latest by February 1st, 1915, and all new ships before they go into active service must be fitted with such radio-telegraphic apparatus as is able to give and receive messages under normal conditions at a distance of 100 nautical miles at least.

That this Order may be carried out, I issue the following instructions:

(1) The shipowner must apply for the permission of the Royal Hungarian President of the Board of Trade to provide a wireless station on board. The application must be accompanied by a technical description of the apparatus and four drawings. The previous permission of the Royal Hungarian President of the Board of Trade must be applied for and received in case of any change of system or of any other alteration which affects the ability of the apparatus to receive and send messages.

(2) The equipment of the station must be such that it shall conform to section 3 of the London Radio-Telegraphic Convention, and it must be able to work in conjunction with other radio-telegraphic stations of a different system—*i.e.*, it shall be able to send and receive messages from them and it must be abreast of the latest developments of technical progress. The previous approval of the Royal Hungarian President of the Board of Trade is necessary for the choice of the system to be applied.

The apparatus must be such that it shall be possible to tune to 300 meters as well as 600 meters wave-length and with these it shall be possible to send and receive at least 20 words per minute, counting the words at 5 letters each. The station, in accordance with the London International Radio-Telegraph Service Rules XXXV. s. 2 a-d, may also use a wave length of 1,800 metres.

(3) The necessary machines and materials for the equipment of the station, if possible, must be acquired in Hungary. Such materials and machines brought from foreign countries can only be used by

special permission of the Royal Hungarian President of the Board of Trade. The auxiliary books and similar official equipment will be supplied at cost price by the General Manager of the Royal Hungarian Post and Telegraph Offices.

(4) All vessels which have a permanent Radio-Telegraphic Station, also those which have limited service in accordance with the London Radio-Telegraph Service Rules s. XI. must have an auxiliary radio-telegraphic equipment fitted in the manner determined by the Royal Hungarian President of the Board of Trade.

This auxiliary equipment must be provided with its own special power supply, which must be absolutely independent of all the other (not radio-telegraphic) power supply equipments of the ship and it must be such that it shall be possible to put it into active service quickly; it shall work for at least six hours and it must be suitable for a range of 80 nautical miles in case of a station in permanent service and 50 nautical miles in case of a station with a limited service.

This special auxiliary equipment can be dispensed with on ships where the regular radiotelegraphic equipment satisfies all requirements.

(5) The speed of transmission and reception will be fixed by the Royal Hungarian President of the Board of Trade in the licence to be issued.

In case of new inventions which promote the reliability and speed of sending and receiving messages to a considerable degree, the Royal Hungarian President of the Board of Trade may compel the shipowner after due and fair consideration of all practical conditions and of cost to apply the new invention on the station within a fixed period.

(6) The electric power used at the radio-telegraphic apparatus must not exceed one kilowatt under normal conditions, and greater power can only be applied in case communications have to be exchanged at a longer distance than 200 nautical miles from the nearest shore station or when by reason of obstacles this greater increase of power is necessary.

(7) The station may be examined and its working controlled by the employees of the General Manager of the Royal Hungarian Post and Telegraph Offices at any time. The shipowner must grant facilities to individuals proposed by the General Manager of the Royal Hungarian Post and Telegraph Offices as well as to the members of the Imperial and Royal Navy through the intermediary of the General Manager of the Royal Hungarian Post or Telegraph Offices to become acquainted with the working of the station, this extending to all particulars, and that they shall acquire the necessary experience.

The shipowner may not agree to any such conditions which the supplier of the equipment might make as that the equipment or any part of it must be kept secret as regards the deputies of the General

Manager of the Royal Hungarian Post and Telegraph Offices and of the Imperial and Royal Navy who cannot be excluded.

The shipowner is obliged to carry without charge in classes according to their rank (including the use of sleeping cabins) persons sent for controlling and studying and must provide them with food at his own charge. For each voyage, however, only two such individuals can be sent.

(8) The Royal Hungarian President of the Board of Trade will determine in the licence the character of the service of the deck station (public, special destination, etc.) and duration (continuous, limited service), the number of operators to be employed and also their qualification in classes I. and II.

(9) The Royal Hungarian President of the Board of Trade reserves the right to suspend at any time the use of the deck-station for an indefinite period or for ever, or in respect of certain specified communications, without giving any reason or indemnity.

In case of mobilisation ordered in the Monarchy of Austria-Hungary or of war, if the commander of the vessel does not receive from the General Manager of the Royal Hungarian Post and Telegraph Offices instructions to the contrary, the station must be put absolutely out of use.

The commander of the ship is responsible for carrying out this rule.

In all other respects the shipowner must comply with the special instructions received in case of mobilisation or war.

(10) The radio-telegraph operators must be Hungarian citizens with an unimpeachable record, who are able to speak or write the Hungarian language perfectly and who have received a diploma from the examining commission sent out by the Royal Hungarian President of the Board of Trade that they thoroughly understand how to handle the radio-telegraphic apparatus.

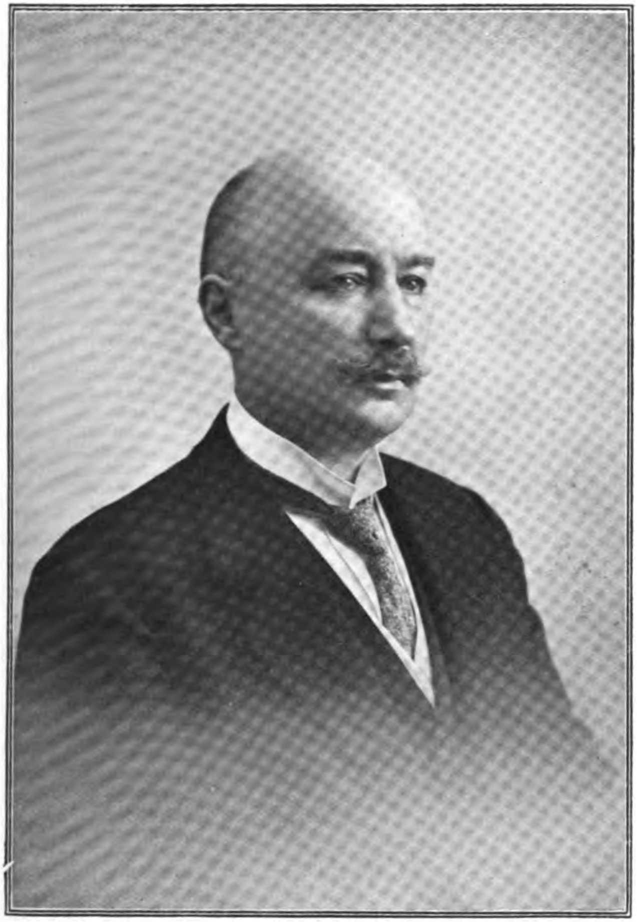
Persons who receive this diploma must take before the examining commission an oath of fidelity to observe their duties and obligations to the service, and amongst these latter they must swear to keep all telegrams secret, which the written certificate will testify.

The employees of the station are subject to the ship's discipline; they must have a "ship service" book and must be included in the list of the crew (or staff).

The shipowner may train for the radio-telegraphic service only such persons whose training has been sanctioned by the General Manager of Post and Telegraph Offices.

Any radio-telegraphic employee whose diploma is cancelled by the General Manager of the Royal Hungarian Post and Telegraph Offices must be dismissed at once.

The shipowner must report to the General Manager of the Royal



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Director-General, Posts and Telegraphs, Norway.

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Hungarian Post and Telegraph Offices and to the Royal Hungarian Naval Authority immediately every change which occurs in the staff of the radio-telegraphic service.

(11) On payment of the regular fees anyone may use such stations for telegraphing as are equipped for public service.

The station fee to be charged must be submitted by the Company to the Royal Hungarian President of the Board of Trade and fixed by him.

The shipowner is entitled to this station fee.

(12) The shipowner is responsible for the telegraphic fees which are due to the Home and Foreign Telegraph Offices from the proceeds of the ship station telegrams. The shipowner—*i.e.*, the deck station—may communicate with foreign Telegraph Authorities and also with the Berne International Telegraph Association Bureau about matters concerning administration only through the General Manager of the Royal Hungarian Post and Telegraph Offices.

(13) The station must enter into communication for exchange of radio-telegrams with all shore and ship stations without regard to the system they use and they must also accept distress signals coming from anywhere and answer them and make the necessary arrangements.

The ship station must have special consideration for the shore station. The ship station must be kept continually in good condition with a view of exact and proper communication with shore stations.

If it is the wish of the shore station, the ship station shall interrupt its communications at once.

(14) With regard to the working of the ship station and the accounting for the fees: the London Radio-Telegraph Agreement and the Service Rules connected herewith, the St. Petersburg Telegraph Agreement and the Service Rules connected with it, as well as the orders of the General Manager of the Royal Hungarian Post and Telegraph Offices whether already issued or still future must be followed.

The ship station—*i.e.*, its owner—must comply with the legislative decisions and regulations concerning telegraph offices, telephones, and electric signals.

In foreign waters they must comply not only with the International Radio-Telegraph Agreement and Service Rules, but also with the special rules (if any) in that particular country. It is the duty of the shipowner to acquaint himself with these.

(15) As an acknowledgment of the right reserved to the State the shipowner must pay at the date mentioned in the licensing document and in cash 20 kronen annually per station and a controlling fee of 30 kronen.

In case an investigation should become necessary in consequence of the negligence or fault of the shipowner or his employee, and the

investigation should find the shipowner or his employee guilty, the shipowner shall refund to the Treasury the entire cost of the investigation.

(16) As a penalty for negligence or mistakes committed in connection with the Radio-Telegraph service—in case it is neither transgression nor criminal—the General Manager of the Royal Hungarian Post and Telegraph Offices can fine the shipowner any sum up to K. 100.

(17) If the ship station does not fulfil its obligations, though repeatedly warned, or if the use of the station is directed against public interest, the Royal Hungarian President of the Board of Trade has the right to apply a penalty of K. 100 up to K. 1,000, or give instructions that a deputy sent out by him shall manage the station service at the expense and risk of the shipping company, and the necessary alterations shall be made at the expense of the shipowner, in order to put a stop to the deficiencies in the deck station equipment, or else he may suspend or withdraw the licence for the telegraph outfit.

(18) The licence for the equipment and upkeep of the Radio-Telegraph station cannnot extend to a longer period than twenty years. After expiry of the period fixed in the licence the equipment, together with the whole appurtenances (furniture, articles of equipment), and together with the auxiliary equipment (if any) shall pass into the ownership of the Royal Hungarian Post in good and serviceable condition, without any charge and free from any liability thereon.

If the Royal Hungarian Post does not desire to take over the station, which thus passes into its ownership, but cedes it for further use to the shipowner, the shipowner must pay 20 kronen, together with and additional to the fees mentioned in section 16, as an acknowledgment of the fact that the ownership of the equipment has been acquired by the State.

Regarding vessels which are withdrawn from service, the licensing document concerning the ship station becomes void, and the shipowner must report this to the General Manager of the Royal Hungarian Post and Telegraph Offices. The transferring of the Radio-Telegraph equipment to another vessel necessitates a new licence.

(19) The Royal Hungarian President of the Board of Trade has the right to take over into State management temporarily or permanently any ship station whenever he chooses without giving a reason, before the licence expires, or to dismantle it.

In case it is temporarily taken over the owner must hand over for use free, and without claim for indemnity, the Radio-Telegraph apparatuses, all necessary articles of outfit for the upkeep and the supplies, as well as the official room and the operators' cabins; he must supply the necessary power for telegraphing, and to the operators

services in kind all free of charge (board, medical treatment, service, etc.). On the other hand, the ship fees are due to the shipowner.

The conditions of the definite taking possession will be laid down by an order to be issued and also by the licensing document.

The definite occupation must take place under normal conditions after six months' notice, but the Royal Hungarian President of the Board of Trade reserves the right in the public interest to reduce this period or take over the station at any time without giving notice.

(20) In the public interest, as to which the Royal Hungarian President of the Board of Trade shall be the sole judge, the General Manager of the Royal Hungarian Post and Telegraph Offices—with the exclusion of every claim for indemnity which can be realised by legal means—can take measures for fitting out any kind of vessel with radio-telegraph at the expense of the Treasury, for the upkeep of the same, and, when the public interest does not demand it any more, for the dismantling of the same; and also to make regulations for refunding a certain indemnity to the owner of the vessel which arises out of this.

(21) The Royal Hungarian President of the Board of Trade reserves the right to make exceptions in certain cases under above rules according to practical requirements.

INDIA

THE Government of India have decided that the granting of licences to military officers in respect of wireless telegraph apparatus used for experimental purposes shall be regulated by the following general principles :—

(1) When an officer conducts experiments in wireless telegraphy in his official capacity at the expense of Government no licence is required, but only executive permission, which may be given so far as the Telegraph Department is concerned by the Director-General, Posts and Telegraphs.

(2) When an officer carries on experiments as a private individual at his own expense he must obtain a licence. If the approval of the military authorities is required to what he proposes to do he should obtain such approval before the Director-General, Posts and Telegraphs, is approached. The licence will then be submitted by the Director-General, Posts and Telegraphs, for the sanction of the Government of India.

(3) With reference to the above, attention is drawn to the necessity for applying for licences to own and use wireless telegraphy apparatus or installations, experimental or otherwise. Applications for such

licences will be submitted through the Chief of the General Staff and will contain particulars regarding the apparatus, showing (*a*) system it is proposed to employ, (*b*) maximum range of signalling with applicants' own receiving apparatus, (*c*) power (current and voltage), (*d*) source of power.

ITALY

THE following is known as the Law of 30th June, 1910, No. 395:—

Art. 1.—The establishment and exploitation of the radiotelegraphic and radiotelephonic installations are reserved to the Government, and in general of all those for which, in the State and in the Colonies, on land and on board ship, energy is employed in order to obtain distance effects without the use of conducting wires.

The Government has the right to grant to any person, public or private scientific or training institution, the authority to establish and to exploit installations of such a nature on land and on the passenger and mercantile vessels, for which previous concession must be obtained.

The licence may be revoked upon the recommendation of the consulting Commission when the installations cause interruption of State stations which were in operation prior to the concession, or when they do not comply with the technical conditions established in the licence.

The exploitation of the installations granted can be revoked, suspended, or taken over by the Government in time of war or during peace whenever the Government may deem it necessary and opportune.

The Government has also the right to inspect, through its officials, those stations which are not the property of the State, in order tc ascertain whether the stations are operated in accordance with the regulations.

Art. 2.—The Government administrations concerned in these services are the Ministry of Posts and Telegraphs, of War and the Admiralty; and special regulations determine the share of the respective departments in the execution of the present law.

A permanent consultive commission is constituted to give opinions upon international agreements, questions of a scientific nature, and upon doubtful points relating to the said services.

The commission shall also decide every doubtful case which may arise of a technical character regarding the installation and exploitation of the concessions according to Art. 1.

The commission shall be qualified to determine the power of the

radiotelegraphic and radiotelephonic apparatus and technical and economic details for their use on vessels engaged in emigration traffic, when the said apparatus has been installed by the Government according to Art. 11 of the Royal Decree, 14th March, 1909, No. 130.

Questions concerning indemnity on account of the cancellation of a licence, suspension of exploitation, or redemption as per Art. 1, shall be referred to an arbitration tribunal, which shall decide, without right of appeal. This tribunal shall be composed of three members, one nominated by the Government, one by the licensee, the third by the President of the Tribunal in Rome. The Government can leave to the said Commission the selection of its own arbitrator.

Where several licensees are interested parties to a dispute, and they are unable by mutual agreement to nominate an arbitrator, each shall submit the name of an arbitrator, and the choice will be made by drawing lots in the presence of a judge of the Tribunal of Rome.

The composition of the Commission in the present article and the rules of its working have been determined in the regulations.

Art. 3.—Every infringement of Art. 1 of the present law is punishable by a fine up to £ It. 2,000, and with imprisonment up to one year, which penalties may be imposed separately and together according to the circumstances. It is in the power of the judge to add to the said penalties the confiscation of the apparatus.

During criminal proceedings the Administration can, in virtue of decree by the prefect, and at all times that in the opinion of the prefect would be in the public interest, obtain immediate possession of the installation and provide if necessary for its removal.

Any person will incur the same penalties if he should avail himself of the installation on board commercial or passenger vessels when they are at anchor in the State waters, except in case of danger or other special cases, which will be dealt with in the regulations.

Art. 4.—If any person should cause damage or deterioration to installations, or in any other manner interrupt, or cause interruption of the service, even temporarily, he will be liable to the penalties laid down in Art. 315 of the Penal Code, except in the case of military interference with military stations, for which offence the penalties stated in the Penal Code will be imposed.

If any person should abuse the use of the alarm signal of the vessels in danger, he will be subject to the same penalties.

Art. 5.—The penalties established by the present law are understood to be applicable, without prejudice, to greater offences which may take down in Art. 315 of the Penal Code, except in the case of military Penal Code.

THE following regulations (No. 227) were published in April, 1912, for carrying out the Act of June 30th, 1910 (No. 395):—

Section I.

1. The Ministry of Posts and Telegraphs shall have under its control:—

(a) The installation and exploitation of the stations for public service and constituting the interior net-work of the State and of all those opened for international communication.

(b) The verifications, inspection and control of the material and working of the service of all the land installations exploited in virtue of Government licence.

(c) The tariff regulation for communication between all land stations and ship and shore stations, also accounting.

The Ministry of War shall have under his control:—

(a) The installation and working of stations destined exclusively to the military service, including movable field stations for use in the R. Army. In time of war the management of the service (either a part or all the stations destined to the public service) can be taken over by the military administration.

The Admiralty shall have under its control:—

The installation and exploitation of the ship stations of the Royal Navy, private and mercantile; the verifications, inspections and control of the materials and of the working of the service of the installations made for passenger and mercantile traffic.

Section II.

2. *Permanent Consulting Radiotelegraphic Commission.*—The Permanent Consulting Commission is composed of a President not belonging to the Government Administration, two members selected amongst persons of well-known ability in electric and radiotelegraphic science, a superior officer of the Royal Navy attached to the General Staff, and a superior officer attached to the office of the Chief of the General Staff of the Royal Navy.

The following are members of the Commission by right:—

(1) The Director of Posts and Telegraphs Higher Institution.

(2) The Director in Chief of the Radiotelegraphic Department of the Posts and Telegraphs.

(3) The Officer-Director of the Radiotelegraphic Department in the Army Office of Rome.

(4) The Superior Officer of the General Staff of the Royal Navy, Chief of the Department of the Submarines, Electric material and Radiotelegraphic Service at the Admiralty.

Three members, selected amongst the three mentioned Administrations, will act as Secretaries.

3. The President, members and secretaries will be nominated by Royal Decree, proposed, by common accord, by the Ministers of the Posts and Telegraphs, Admiralty, and War.

By Ministerial decree extraordinary members, without vote, can be added temporarily, these to be selected from persons of well-known skill, proposed by the President of the Commission.

4. The Commission shall have its office at the Admiralty in Rome. The meetings of the Commission are to be convened by the President at the request of the interested Administrations.

5. The opinion of the Consulting Commission can be asked on the following subjects:—

(*a*) On the compilations of arrangements and special rules for the technical organisation of the radiotelegraphic and radiotelephonic service of the State, as well as for practical rules for the constitution and exploitation of the installations.

(*b*) On all questions of a scientific nature, and doubtful cases referring to the radiotelegraphic and radiotelephonic services.

(*c*) On International Conventions.

(*d*) On technical conditions with reference to licences of radiotelegraphic and radiotelephonic stations.

(*e*) The establishment, before granting the licence, of indemnity due in case the installation should be repealed, suspended, or taken over by the State according to paragraph III., Art. I. of the law.

(*f*) Repeal of the licences.

(*g*) On the adoption of new radiotelegraphic and radiotelephonic systems, and on the application of same by the Government service, unless they should deal with interesting systems concerning the defence of the State.

The qualified Administrations may whenever they think it warranted ask the opinion of the Commission on any subject.

The Commission is entitled to avail itself for its own study of the working rooms and of the Government experimental stations, but a previous application must be lodged with the Administrations.

6. The expenses for the working of the Commission are to be divided amongst the three Administrations interested.

Section III.

7. *Licences for the Exploitation of Radiotelegraphy and Radiotelephony.*—Licences to persons, to institutions, and to public and private Administrations for the installation of any radiotelegraphic or radiotelephonic station will be granted in virtue of an agreement containing the conditions to be observed, by a decree issued by the Ministry of the Posts and Telegraphs, acting in harmony with the Ministry of War and the Admiralty.

Such licences cannot last longer than the 16th February, 1917. After this period the licence can be renewed.

8. Licences for radiotelegraphic stations for private use are

limited to private correspondence between properties of the same licensee or between properties of two licensees, all correspondence with third persons being absolutely excluded. Such licences are exempted from tax when the stations are constructed on private property and work over all the territory dividing the stations, without interruption by public land.

Licences are also exempted from taxes which are granted for installation of radiotelegraphic and radiotelephonic stations having for object a scientific or educational purpose.

9. All applications for licences for radiotelegraphic and radiotelephonic installations must contain :—

(*a*) The exact indication of the person or institution making the application and their legal residence.

(*b*) The nature and purpose for the licence, the place or places where it is proposed to instal the station or stations, and their presumed zone of service.

(*c*) The detailed plans for the construction and technical quality of the installation, indicating in a detailed manner the nature and power thereof.

(*d*) The period for which the licence is asked.

(*e*) The period required before starting the station.

(*f*) The receipt of the amount to constitute the deposit-guarantee, as per Art. 13 and 14.

Such a deposit must be paid to the cashier of the local Provincial Direction of Posts and Telegraphs by the applicant for the licence.

10. Every contract by the licensee, having for object the hire, amalgamation, partial or complete transference of the licence or licences, cannot take place before obtaining in advance the approval of the Government.

11. The licence is considered as expired should the licensee fail to complete and have ready for service the radiotelegraphic or radiotelephonic installation within the time stipulated as per paragraph (*e*) Art. 9.

The licence is considered as expired on the death of the licensee.

12. The officials of the State Telegraphic Administration shall be responsible for the maintenance of the installation and proper up-keep of the radiotelegraphic and radiotelephonic land stations for which a licence is granted; they shall satisfy themselves that the licensee observes the law and the present regulations and that the licensee fulfils all the obligations imposed upon him by his contract with the Government.

13. Every licensee for radiotelegraphic or radiotelephonic installation for private use, excepting the cases considered in Art. 8, will pay in advance to the State an annual fixed tax of £It.50.

To guarantee the said tax the licensee must make a deposit as guarantee equal to the amount of fixed tax for one year.

14. Every licensee for radiotelegraphic or radiotelephonic installations for public use will pay every year to the State in quarterly instalments a tax corresponding to 10 per cent. of the revenue from radiotelegraphic or radiotelephonic charges on the basis of the common tariff.

To guarantee the said tax the licensee will make a deposit as guarantee of not less than £It.200. If after one year the guarantee shows to be less than the amount due to the State for one year, then the deposit must be brought to the level of such proportion.

15. The period of the licence and the obligation of the tax established by Articles 13 and 14, begin from the month following the decree granting the licence.

16. The deposits as per Articles 13 and 14 will be forfeited to the public exchequer in case of withdrawal or termination of a licence.

Should the licensee fail to provide for the payment of the taxes due as per Articles 13 and 14, the Government will apply the deposit, which should be increased in its integral amount within ten days of the said confiscation.

Section IV.

17. *Qualifications for the Radiotelegraphic and Radiotelephonic Service.*—The staff necessary for the management and working of the radiotelegraphic and radiotelephonic service is appointed as follows:

(*a*) For the stations under the control of the Ministry of Posts and Telegraphs, from amongst the officials of specialists of first, second, third and fourth class.

(*b*) For the stations under the control of the Ministry of War, amongst the officers and privates of the engineers of the R. Army.

(*c*) For the stations under the control of the Admiralty, from amongst the officers of the staff and the marines.

Should it at any time be found convenient to the management and working of the above-mentioned stations, a mixed staff selected from the three Administrations can be employed.

The Ministry of the Posts and Telegraphs can for an educational purpose always send its own staff to the radiotelegraphic and radiotelephonic commercial stations by making previous arrangements with the interested Administration.

18. The staff to be employed in the radiotelegraphic stations licensed to private persons must possess a certificate proving their professional ability.

Such a document is granted either by the Ministry of Posts and Telegraphs, or by the Admiralty, according to the service for which it is intended.

Section V.

19. *Limitations to the use of Radiotelegraphic and Radiotelephonic Apparatus.*—Cargo and passenger vessels are prohibited from using their own radiotelegraphic or radiotelephonic stations when they are at anchor in the State waters, except in cases of giving warning of danger or appeals for help, or when they are about to sail, or for urgent reasons within an half an hour after their arrival and when the communication with the land is cut off for special reasons or for sanitary measures.

A breach of this rule will render the transgressor liable to the penalties imposed by Article 3 of the law.

Section VI.

20. *Taxes.*—The land tax for one radiotelegram is composed:

(*a*) Of the radiotelegraphic tax due to the coast station;

(*b*) Of the radiotelegraphic tax due to the station on board;

(*c*) Of the telegraphic tax.

For taxation purposes only those radiotelegrams exchanged with Board stations are considered.

21. All the radiotelegraphic and radiotelephonic stations installed before the promulgation of the law must apply for a licence within one calendar month of the present regulation.

JAMAICA

The Telegraph Control Law, 1904.

NO person shall, within the Colony or any of its Dependencies, establish, maintain or use any telegraphic apparatus, mechanism, or contrivance, of what nature or kind soever the same may be, without due permission or licence under the hand of the Governor previously obtained for that purpose.

It is hereby expressly declared that what is commonly known as "wireless telegraphy," including the Marconi apparatus and any similar or other mechanism or contrivance whatsoever for the transmission of telegraphic messages without the employment of wires or cables, is a telegraphic apparatus, mechanism, or contrivance within the meaning of this Section.

2. It shall be lawful for the Governor in Privy Council from time to time to make and as he shall see fit repeal, alter or vary rules and regulations for all or any of the following purposes, viz:—

Permitting or licensing any person to establish, maintain, or use any telegraphic apparatus, mechanism, or contrivance, whether for the service of the public or for any private purpose;

Attaching conditions, restrictions, and limitations to the exercise of the privilege by such permission or licence conferred:

Providing suitable penalties and forfeitures for the contravention

of the prohibition above contained in Section 1 of this law, and to the breach of any rule or regulation made thereunder, and providing for the recovery thereof, summarily or otherwise; provided that the penalty (over and above forfeitures) to be imposed for any one offence shall in no case exceed a fine of Two Hundred Pounds, or in default of payment thereof imprisonment, with or without hard labour, for a period not exceeding twelve months;

The exercise of all such powers and control over telegraphic establishments (by temporarily entering into possession thereof or otherwise) as may be necessary for the public safety, whether at all times, or in any case of emergency which may arise;

And generally for the better carrying out of the purposes of this law.

Such rules and regulations shall come into force as from the date of publication thereof in the *Jamaica Gazette*.

3. Nothing in this law contained shall invalidate or impair any legal right already possessed by any telegraph or cable company, relative to the laying down or landing of any telegraphic cable, the removal, renewal, maintenance, and use thereof, or any other like matter.

4. Law 1 of 1903 is hereby repealed.

Law 21 of 1909.

The Direct West India Cable Company's Law, 1909.

Whereas the Direct West India Cable Company, Limited, is desirous of establishing a wireless installation for communication between ships and the shore in Jamaica;

And whereas under the provisions of Law 7 of 1904, entitled "The Telegraph Control Law, 1904," no person shall establish, maintain, or use within the Island of Jamaica, or any of its Dependencies, any apparatus or machine whereby communication by Wireless Telegraphy can be held between the said Island and ships, without having first obtained the sanction of and a Licence from the Governor;

And whereas a Licence to erect such a wireless station has been granted to the Direct West India Cable Company, Limited, by the Governor of Jamaica;

Be it enacted by the Governor and Legislative Council of Jamaica, as follows:—

1. The protection, rights, powers, and facilities already granted to The Direct West India Cable Company, Limited, under Law 16 of 1898, entitled "The Direct West India Cable Company's Law, 1898," are granted and extended for the purposes of wireless telegraphy installation to be installed by the company or worked and maintained by them in so far as they may be applicable to the satisfactory and efficient working and maintenance of a wireless station or stations.

2. The Government of Jamaica shall acquire for the use and at the expense of the company a piece of land of sufficient dimensions at a place to be selected by the company and approved by the Government suitable and convenient for the economical erection, maintenance, and working of the installation, and when acquired such piece of land shall be conveyed to the company in fee simple, or if the Government of Jamaica possesses a piece of land of sufficient dimensions at a place approved by the company suitable and convenient for the economical erection, maintenance, and working of the installation and which the Government considers it desirable the company should have, the Government may sell the said piece of land at a price to be mutually agreed upon, or the Government may rent it to the company on such terms as may be agreed on during the period of the licence or for so long as the company may continue to work a wireless station or stations.

The acquisition of land by the Government of Jamaica under this section shall be deemed as an acquisition for public work within the meaning of the Public Lands Acquisition Law, 1897 (Law 31 of 1897).

JAPAN

IN accordance with the Telegraph Act of Japan, 1900, "The Telegraph and Telephone Service shall be under the supervision of the Government," but private telegraphs or telephones may be established subject to certain regulations. The following regulations have been made regarding wireless telegrams:—

1. The expression "wireless telegram" means any telegram to be transmitted by wireless telegraphy.

2. In the present Regulations the term "coast station" means any telegraph office on land equipped with wireless telegraph apparatus, and the term "ship station" means any telegraph office on board a ship equipped with wireless telegraph apparatus.

3. Wireless telegrams shall bear the following abbreviated instruction:—

"R A" in the case of Romanised telegrams.

4. The name of a coast station through which a wireless telegram destined for a ship station is to be transmitted shall be indicated within parentheses in the address of the telegram, but such indication shall not be counted in the number of words even in the case of a Romanised telegram.

In case such coast station cannot transmit the telegram, but there is another coast station which is able to do so, the intermediary of the latter may be resorted to. If a telegram destined for a ship can be delivered direct to the addressee from a telegraph office on land, it may be delivered from such office without the use of wireless telegraphy.

(*a*) Wireless telegrams to be transmitted by way of intermediate ship station, with the exception of those handed in at a ship station, shall bear the following abbreviated instruction:—

"R S" in the case of Romanised telegrams.

Such intermediary transmission can in no circumstances be made more than once.

5. If the sender of a wireless telgram destined for a ship station wishes to indicate the term during which his telegram is to be kept at the coast station, the number of days shall be inserted in the telegram as paid instruction.

Wireless telegrams without such instruction will be retained at the coast station for nine days from the day of handing in. However, in case the transmission of a telegram cannot be effected on account of the ship station's leaving out of the radius of action of the coast station or for any other reasons, the telegram may not be retained, if the retention is deemed unnecessary.

6. If the sender wishes to prolong the term of retention mentioned in Article 5, application to that effect shall be made to the coast station before the expiration of the term. The same applies to further prolongation of the term. In such case, the term of retention will be nine days, unless specially indicated.

The application shall contain the date of handing in, number of characters or words and the names of the sender and addressee of the wireless telegram.

The sender may make the application mentioned in Paragraph 1 through the office of origin. If he wishes it notified to the coast station by telegraph, he shall pay the charge for a paid service telegram for the purpose.

7. The transmission of a wireless telegram is to be effected when both the sending and receiving offices are within the guaranteed range of action of each other.

8. Wireless telegrams concerning the distress of a ship shall be sent or received with absolute priority by a coast or ship station, all other correspondence being suspended.

9. Paid service telegrams concerning enquiry, rectification and stoppage of a wireless telegram to which reply is required can be exchanged only between telegraph offices on land.

10. "Urgent telegrams," "redirected telegrams," and "telegrams with acknowledgment of receipt" are admissible between telegraph offices on land.

The sender of a wireless telegram with acknowledgment of receipt will be notified of the date and time at which the coast station has transmitted the telegram to the ship station.

(*a*) Telegrams of the same text originating from the same ship station or from the same telegraph office on land, and passing

through the same coast station, may be made a multiple telegram, so far as concerns the transmission between wireless telegraph stations or between telegraph offices on land, as the case may be, no matter whether the addresses of such telegrams be in different localities or they be served by different offices of destination. The telegram shall bear the following abbreviated instruction instead of that for an ordinary multiple telegram :—

"S M" in the case of Romanised telegrams.

Paragraph 2 of Article 4 is not applicable to the multiple telegram mentioned in the preceding paragraph when it is to be distributed to two or more ship stations, unless every copy of such telegram can be transmitted through the same coast station or delivered from the same telegraph office on land.

(*b*) Reply-paid wireless telegrams shall bear the abbreviated instruction for "reply paid," "urgent reply paid," or "collated reply paid," completed by the mention of the prepaid amount. If a prepaid amount is 60 sen in the case of *kana* telegrams, and 75 sen in the case of Romanised telegrams, the mention of the amount is not required.

11. Wireless telegrams are subject to the following charge for the operation at a coast station or a ship station in addition to the ordinary telegraph charge. It is provided, however, that the ordinary telegraph charge is not levied on a telegram which is to be transmitted only by wireless telegraphy.

For Government and Ordinary Telegrams.

Coast charge: For a *kana* telegram, 20 sen up to fifteen characters, 5 sen for every additional five characters or less.
For a Romanised telegram, 25 sen up to five words, 5 sen for every additional word.

Ship charge: Ditto.

For Press Telegrams.

Coast charge: 20 sen for every fifty characters or fraction thereof.

Ship charge: Ditto.

(*a*) The following charge is levied in the same way as mentioned in the preceding Article on a supplementary copy of a multiple wireless telegram.

For Government and Ordinary Telegrams.

Coast charge: For a *kana* telegram, 10 sen;
For a Romanised telegram, 15 sen.

Ship charge: Ditto.

For Press Telegrams.

Coast charge: One-half the charge for the original telegram.

Ship charge: Ditto.

(*b*) If, in the case where Paragraph 2 of Article 4 is applied, the amount paid fall insufficient, the deficiency is collected from the addressee. In the case of a multiple telegram the amount to be collected is divided by the number of copies, and the quotient shall be the sum to be collected from one addressee.

12. Wireless telegrams are free from special charge applicable to telegrams handled out of the ordinary hours of duty.

13. The following charges for a wireless telegram shall be refunded less the amount which has been appropriated for another charge :—

(1) The charges pertaining to the transmission by wireless telegraphy when not effected.

(2) The charges pertaining to the transmission on telegraph lines when not effected.

14. An application for the refund of charges for a wireless telegram handed in at a ship station may be sent in through any telegraph office.

15. The term of retention mentioned in Articles 5 and 6 is not reckoned in the period of delay giving rise to refunds.

16. All matters not provided for in the present Regulations are governed by other rules applicable to "inland telegrams," with the exception of Articles 71, 114, 121, 126 to 130, 146 to 148 of the Regulations regarding Inland Telegrams.

(*a*) The provisions of every preceding Article are applicable to telegrams exchanged by means of wireless telegraphy between offices on land in case of interruption or bad working of submarine cables. The Minister of Communications may fix a special charge for such telegrams, if he deems necessary.

With regard to the special treatment of wireless telegrams, as well as the special charge mentioned in the preceding paragraph, it will be notified in other ways.

The following supplementary regulations came into operation on July 1st, 1913, and apply to all Japanese possessions :—

1. Foreign wireless telegrams are understood to be those which are treated according to the regulations of the London International Radiotelegraphic Convention or to the regulations concerning the radiotelegraphic service concluded between the Government of the Empire and foreign Governments or companies.

2. The rates to be charged for foreign messages through Japanese coast and ship stations are as follows :—

1. Coast station rate, 24 yen (fr. 0.60) per word.

2. Ship station rate, 16 yen (fr. 0.40) per word.

The coast station rate referred to in the preceding paragraph includes the rate applicable to the transmission on telegraph lines for wireless messages originating in or destined for the Japanese Empire or Southern Manchuria or for ships' stations

transmitted through Japanese coast stations and the Japanese telegraph service. As regards urgent wireless messages for transmission over land lines, an extra 10 yen (fr. 0.25) will be charged.

3. The rates to be charged for foreign radiotelegrams through foreign coast or ship stations will be indicated separately.
4. The ordinary rate for foreign wireless messages accepted by a Japanese ship station for transmission through a foreign coast station will be fixed by the owners of the said foreign coast station.
5. For the acknowledgment of receipt of foreign wireless messages handed in at a Japanese telegraph office and destined for a ship station and transmitted thereto through a Japanese wireless coast station, the rate for the acknowledgment of receipt of interior telegrams for transmission between Japan and Southern Manchuria will be charged.
6. At the request of the receiver, or of the person empowered to receive messages for and on behalf of the receiver, wireless messages may be retransmitted only over Japanese land lines.
7. When the Japanese coast station given by the sender of a foreign wireless message destined for a ship cannot transmit the said message it may be transmitted through another Japanese coast station, provided such station is suitable for the purpose. This provision also applies in case the Japanese ship station cannot transmit a foreign wireless message to a Japanese coast station mentioned by the sender and where another Japanese coast station exists and which is capable of performing the duty.
8. Japanese ship stations cancel foreign wireless messages when they are not in a position to transmit the same to the corresponding stations.
9. Should a foreign wireless message be cancelled in accordance with Article 8, the sender shall be at once advised and the money paid by him returned without delay.
10. For everything which is not mentioned in these regulations the regulations relating to foreign telegrams are applicable.

MAURITIUS

AN Ordinance (No. 33) was issued in 1903 empowering the Governor to grant or withhold leave to erect receiving and transmitting stations for Wireless Telegraphy.

Clause 1 reads :—

No telegraphic or electrical station, apparatus, machinery, or implements whatsoever, for the purpose of electrical com-

munications, transmission, emission, or reception of messages, by what is generally known as "wireless telegraphy," between any places in Mauritius, or between any place in Mauritius with any place out of Mauritius, shall be erected or used in any place in Mauritius, whether on public or private property, without the sanction of the Governor previously obtained.

Section 2 reads :—

The Governor may refuse such sanction or grant it under such conditions as he may think fit.

By Section 3 :—

The word "place" in paragraph (1) shall include any ship or floating conveyance within or without the waters of Mauritius, except vessels of His Majesty's Navy.

Clause 2 :—

Any person contravening any of the provisions of this Ordinance shall be liable to a fine not exceeding 5,000 rupees, and every apparatus, machinery, or implement used in, or connected with, the commission of the offence shall be forfeited.

Clause 3 :—

The Court may further order, on the application of the Ministère Public, or person authorised by the Ministère Public, the immediate pulling down or removal of any building, apparatus, machinery, or implement used in the commission of the offence.

The Wireless Telegraphy Ordinance No. 33 of 1903 has been amended by the Wireless Telegraphy (Amendment) Ordinance, 1912, the effective clause (1) of which reads :—

It shall be lawful for the Governor in Executive Council to make regulations concerning the use of wireless telegraphy on board merchant ships, whether British or foreign, while in the territorial waters of this Colony.

NEWFOUNDLAND

WIRELESS telegraphy in Newfoundland is governed by the Post and Telegraph Acts, 1891 to 1906. The 1906 Act reads as follows :—

1.—(1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy, in any place in this Colony, or on board any ship registered in this Colony, except under and in accordance with a licence granted in that behalf by the Postmaster-General, with the consent of the Governor in Council.

(2) Every such licence shall be in such form and for such period as the Postmaster-General may determine, and shall contain the terms, conditions, and restrictions on and subject to which the licence is granted, and any such licence may include two or more stations, places or ships.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour, and be liable on conviction in a summary manner before a Stipendiary Magistrate to a penalty not exceeding fifty dollars, and on conviction on indictment to a fine not exceeding five hundred dollars, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General.

(4) If a Stipendiary Magistrate is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship as aforesaid without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Postmaster-General, and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) When a fine under this Act is imposed by a Court, Judge or Magistrate, and the master or owner of any ship is ordered to pay the same and the same is not paid at the time and in the manner prescribed, the Court, Judge, or Magistrate making the order may, in addition to any other powers they may have for the purpose of compelling payment, direct the amount remaining unpaid to be levied by distress and sale of the ship, her tackle, furniture and apparel.

(6) The Postmaster-General may make regulations for prescribing the form and manner in which applications for licences under this Act are to be made, and with the consent of the Governor in Council, the fees payable on the grant of any such licence.

(7) The expression "wireless telegraphy" means any system of communication by telegraph as defined in "The Post and Telegraph Acts, 1891 to 1904," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

2. This Act shall be read with and form part of "The Post and Telegraph Acts, 1891 to 1904," and the said Acts and this Act may be cited as "The Post and Telegraph Acts, 1891 to 1906."

The Act of 1905, Cap. VII., refers to taxes upon business transacted by telegraph and telephone companies within and in transit through the Colony. Clause 2, Section 2, reads as follows :—

A sum equal to one per cent. in manner hereinafter provided of the total amount received by or due to the company in respect of all telegraphic messages passing over the land lines of the company or transmitted or received by any wireless method of telegraphy to or from any place within this Colony from or to any other place within this Colony during a period of twelve calendar months ending on the first day of May of each year: Provided that this sub-section shall not apply to messages which originate or are delivered in any place outside the Colony.

The first of such payments shall be made on the 30th day of June, 1906, in respect of the period of twelve months ending on the preceding first day of May.

Section 4 of the same Clause (2) reads as follows :—

A sum of four thousand dollars ($4,000) in respect of every wireless telegraph station or other means of communication by wireless methods of telegraphy between this Colony and any place, ship or vessel outside this Colony, for the time being belonging to or worked by or on behalf of the company which now is or hereafter shall be established in this Colony.

The first of such payments shall be made on the 30th day of June, 1906: Provided that if the Governor in Council is satisfied that any such wireless telegraph station or other such means of communication is established for the purpose only of reporting passing ships or vessels, he may dispense the payment of such last-named sum and discharge the company from liability therefor in respect of such station or means of communication.

Clause 1 (1) of the Act of June 15th, 1905, Cap. XXI., reads :—

Whenever in the opinion of the Governor an emergency shall have arisen in which it is expedient for the public service that the Government of the Colony shall have control over the transmission of messages over any telegraph line, telephone line, or by any other form of telegraphy, it shall be lawful for the Governor in Council at any time to assume and for any length of time retain possession of any telegraph line, telephone, or any form of telegraphy in this Colony, and of all things necessary for the efficient working thereof, and may for the same time require the exclusive service of the operators and other persons employed in working such telegraph line, telephone, or any form of telegraphy; and the company or other proprietor of such telegraph line, telephone, or any form of telegraphy, shall give up possession thereof, and the operators and other persons so employed shall, during the time

of such possession, diligently and faithfully obey such orders and transmit and receive such despatches as they are required to receive and transmit by any officer duly authorised by the Governor in Council, and every company or other proprietor, operator or person violating any of the provisions of this section shall incur a penalty not exceeding one hundred dollars ($100) for every refusal or neglect to comply with the requirements thereof, such penalty to be recovered by action in the name of the Minister of Finance and Customs, in a summary manner before a Stipendiary Magistrate or Justice of the Peace.

In 1906 an agreement was made under which the Marconi Wireless Telegraph Company of Canada undertook to operate all the Labrador stations during the fishing season of each year, the Newfoundland Government to pay the company an annual royalty, and the revenue accruing from this traffic to go to the latter, who further agreed to forward all traffic over the Newfoundland Government Postal Telegraph System.

The success of this arrangement prompted the Government to propose an extension of the system on the Labrador by two or more stations—the Marconi Company to erect and operate these stations on the terms provided in the agreement. In the summer of 1910 stations were accordingly erected by the Marconi Company at Cape Harrison and Mokkovik. In 1911 it was agreed to establish a station between Indian Harbour and Cape Harrison to complete the chain on the Labrador.

After further negotiations, an important agreement was executed in December, 1912, which covers the following points: The old agreement terminating in 1916 is extended for a further period of ten years, terminating in 1926; all other undertakings entered into in the earlier agreement will be continued until 1926; the Marconi Company to erect and operate a station at Fogo, on the East Coast of Newfoundland—this station to be the property of the Marconi Company, and to be exempt from the Government tax of $4,000 during the term of the agreement.

NEW ZEALAND

THE following extract from Section 10 of the Post and Telegraph Act 1908 relates to wireless telegraphy in the Dominion :—

162. The Governor may from time to time establish stations for the purpose of receiving and transmitting telegraph messages within New Zealand or between New Zealand and parts beyond New Zealand by what is commonly known as "wireless telegraphy,"

including in that expression every method of transmitting messages by electricity otherwise than by wires, whether such method is in use at the time of the coming into operation of this Act, or is hereafter discovered or applied.

163. The provisions of Part VII. of this division of this Act shall, as far as is applicable, *mutatis mutandis*, extend and apply to stations established under this part of this Act, and to communications by wireless telegraphy.

164. Every person who erects, constructs, or establishes any station or plant for the purpose of receiving or transmitting communications by wireless telegraphy without having first obtained the consent of the Governor in Council is liable to a fine not exceeding five hundred pounds, and any plant, machinery, instruments, and material used by him for such purpose may be forfeited and dealt with as the Minister directs.

Part VII. of this division of the Act referred to deals with the construction and regulation of electric lines. It authorises the Governor to establish electric lines and purchase lines and plant. He may make regulations as to the management, working and maintenance of any telegraph. Any officer or person employed in the working of any telegraph who improperly divulges the contents of any telegram transmitted or presented for transmission by such telegraph, or the purport of such telegram, is liable to a fine not exceeding one hundred pounds, or to imprisonment with hard labour for any period not exceeding six months.

THE following regulations as to ships being provided with wireless telegraphy apparatus were approved by the Governor on October 20th, 1913:—

Whereas it is enacted by Section 50 of the Shipping and Seamen Amendment Act, 1909, that the Governor may from time to time by Order in Council make regulations requiring ships registered in New Zealand, and carrying passengers, to be provided with apparatus for transmitting messages by means of wireless telegraphy, and may by such regulations prescribe fines not exceeding fifty pounds for any breach thereof by the owner or master of a ship: And whereas it is desirable to make such regulations:

Now, therefore, his Excellency the Governor of the Dominion of New Zealand, in exercise of the hereinbefore-recited power and authority, and acting by and with the advice and consent of the Executive Council of the said Dominion, doth hereby make the following regulations, and doth hereby order that they shall come into force on the first day of July one thousand nine hundred and fourteen:

Provided that, if in his opinion the circumstances justify it the

Minister of Marine may exempt any steamship from the operation of these regulations, and may limit the time for which any such exemption shall be in force.

REGULATIONS.

1. Every steamship registered in New Zealand, and carrying passengers, which is engaged in the foreign or intercolonial trade, except steamships trading to the Chatham, Auckland, Campbell, and Antipodes Islands, and every home-trade steamship which is authorised by her ordinary survey certificate to carry not less than 150 passengers at sea, shall not leave or attempt to leave any port in New Zealand unless such steamship is equipped with an efficient apparatus for radio communication in good working order, to be operated by a person skilled in the use of such apparatus, which apparatus shall be capable of transmitting and receiving messages over a distance of at least one hundred miles, day or night.

2. Ships required by these regulations to carry the apparatus prescribed above shall be placed in the third class as defined by Article XIII. of the Detailed Service Regulations appended to the International Radiotelegraph Convention, 1912—that is, they are not bound to perform any regular listening service.

3. The Minister of Marine may appoint Inspectors for the purposes of these regulations, and such Inspectors and Superintendents of Mercantile Marine may visit any steamship required by these regulations to be equipped with apparatus for radio communication before they leave port, and ascertain if they are equipped with such apparatus the operation of which shall be carried out by a telegraphist holding a certificate as prescribed by Article X. of the Detached Service Regulations attached to the International Radio-telegraphic Convention.

4. Where a passenger steamship subject to these regulations is without the apparatus and the operator prescribed, and is about to attempt to leave port, an Inspector or Superintendent shall—

(*a*) Notify the master of the fine to which he will be liable, and of the particulars in respect of which the law has not been complied with;

(*b*) Notify at once the Collector of Customs, who may thereupon withhold the vessel's clearance until the requirements of these regulations are complied with;

(*c*) Prepare a report in writing of his action and transmit it to the Collector of Customs, who shall forward a copy to the Secretary of the Marine Deparment.

5. An Inspector or Superintendent may, at any time before a vessel subject to these regulations leaves port, require the master to give him a certificate, in the form set forth in the Appendix hereto, that the wireless apparatus of his ship is efficient and in good working order, and the master shall give such certificate before the vessel leaves port.

6. The power necessary to transmit signals shall at all times, while the vessel is under way, be available for the wireless operator's use.

7. Subject to the above regulations, the installation and operation of the apparatus required by them to be fitted shall be in conformity with the requirements of the Post and Telegraph Act, 1908, and its amendments, and the regulations made thereunder.

8. Any master or owner of a steamship committing a breach of these regulations is liable to a fine not exceeding £50.

APPENDIX.

This is to certify that the wireless operator in principal charge of the apparatus for radio communication on the s.s. "......................" has this day certified to me in writing that the said apparatus is efficient and in good working order.

(Signed)....................................

(Master).

NIGERIA (NORTHERN)

THE following Proclamation providing for the control by the Governor of electrical communication by Wireless Telegraphy was issued in 1904:—

1. This Proclamation may be cited as the Wireless Telegraphy Proclamation.

2. No person shall import, keep, use or establish any apparatus or installation for transmission of messages by wireless telegraphy without previously obtaining from the Governor a licence setting forth the terms and conditions upon which the same is granted.

3. Any person infringing this Proclamation shall be liable upon conviction in addition to confiscation of every such apparatus and installation to a penalty not exceeding £500 or in default to imprisonment for a term not exceeding twelve months or to both.

4. It shall be lawful for the Governor from time to time by Proclamation to prescribe the terms and conditions upon which, if at all, such licence is granted.

NIGERIA (SOUTHERN)

1. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1913.

2. In this Ordinance, the following words and expressions shall have the meanings hereby assigned to them unless there is something in the subject or context repugnant to such constructions:—

"Wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received.

"Colony" includes Protectorate.

3. (1) A person shall not establish any wireless telegraph station or install or work any apparatus for wireless telegraphy in any place in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made under this Ordinance.

5. (1) The Governor may make regulations for carrying into effect the purposes of this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or revoked by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a District Commissioner is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any police officer or any person appointed in that behalf by the Inspector-General of Police and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on conviction before a District Commissioner, anything in the Supreme Court Ordinance to the contrary notwithstanding, to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

8. Nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than that of wireless telegraphy.

9. The Wireless Telegraphy Ordinance and the Wireless Telegraphy (Amendment) Ordinance, 1912 [THE YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, p. 183], are hereby repealed.

SCHEDULE.—SECTION 5 (2).

REGULATIONS.

(*i.*) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(*ii.*) In these Regulations "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

(*iii.*) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

(*iv.*) For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(*v.*) Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

(*vi.*) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

NORWAY

THE law of July 16th, 1907,, reads as follows :—

1. Stations or establishments of wireless telegraphy or telephony can be installed and worked within, as well as without, the limits

of the kingdom, on vessels carrying the Norwegian flag and not belonging to the Norwegian Navy, after a grant of a licence from the King or a person authorised by him, on certain definite conditions and for a prearranged period of time. This licence can be annulled at any time if the provisions therein established are not observed.

Transmission by wireless telegraphy or telephony on vessels sailing under foreign flags in Norwegian territorial waters—even when the vessels have received a concession from the authorities of the foreign country—can only be carried out on condition of conforming to the regulations made by the King, or by the person authorised by him, who, moreover, is empowered to forbid, if necessary and circumstances demand it, all telegraphic or telephonic transmission.

2. The exceptions mentioned in the law of April 29th, 1899, under Article 1, Paragraph 2, relative to the working of establishments for common or private use, or concerning establishments created by railway companies for their own use, are not applicable to the working of establishments of wireless telegraphy or telephony.

3. Every contravention of the present law will be subject to the penalties prescribed in Article 6 of the law of April 9th, 1899.

The following regulations are based on the law of July 10th, 1907, and were approved by the Royal Decree of October 24th, 1908:—

1. No radiotelegraphic station on board a foreign vessel within the limits of Norwegian territorial waters can be used without a special licence.

Application for such licence must be made to the Ministry of Telegraphs, which Ministry, after consultation with the Ministry of Marine, will decide on the application.

2. The licence granting the right to use wireless telegraphic stations within the radius of Norwegian territorial waters may be limited to definite places and to fixed hours of the day.

Wireless transmission of messages must be stopped immediately on the order of the Ministry of Telegraphs, Ministry of Marine, or of any coast station established by the aforesaid Ministries.

3. If the vessel is in a Norwegian port situated within a radius of 5 kilometres from the nearest telegraphic station, the station on board the vessel cannot communicate either with Norwegian coast stations or with foreign coast stations.

Without a special licence, a wireless station on board a vessel in a Norwegian port cannot be used for the exchange of messages with other ship stations, unless for the purpose of advising accidents.

4. However, the preceding provisions do not apply to foreign ships of war, as far as the interchange of messages between themselves is concerned.

It is the duty, nevertheless, of stations on board foreign warships to conform to the provisions in Article 2, Paragraph 2, above.

5. If a station is used when a ship is in Norwegian territorial waters this station must conform to the provisions of the International Telegraphic Convention, and the regulations appended thereto.

THE licence for the erection and working of a wireless telegraph or telephone station on board ship contains the following conditions :—

In accordance with the Statute of July 16th, 1907, and the Royal resolution dated August 30th, 1913, licence is given for ...., on board the s.s. ...., for erection and working of radiotelegraph station (radiotelephone station), arranged as indicated in the schedule below.

This licence takes effect from .... till ...., and is given on the following conditions :—

1. The station to belong to class .... as required by the London International Convention, 1912 (Article XIII. b), and thus to have .... time for service.

2. As to erection and design, the plan approved by the Telegraph Administration must be followed in all respects, and must not be deviated from without the permission of said Administration.

3. The licensee is bound as regards erection and working of the station in all respects to conform to any International Conventions or resolutions with reference to radiotelegraphy and telephony as well as to the decisions which might be issued by the Department for Official Works or by the Telegraph Administration, efficient at any time and entered upon by Norway.

4. The Telegraph Administration may in the interests of the service, and after the necessary consultation with the Marine Administration, demand any change as to the wave-lengths employed and indicated in said schedule—within the limits prescribed by the regulations—either as a temporary or a permanent arrangement for the working of the station.

5. The licensee shall maintain the station in good working order.

6. The station must convey telegrams to and from persons on board ship and communicate with other ship stations and coast stations regardless of the system and apparatus of said stations.

7. Signals calling for help from ships in distress must take precedence over all other correspondence.

8. While the ship is lying in a Norwegian port, the station shall not be used for correspondence either with Norwegian or with foreign coast stations.

When the ship is in a Norwegian port, the station shall not be used for communication with other ship stations, except when it is necessary for the prevention of accidents, or unless special permission has been granted by the Norwegian Telegraph Administration after consultation with the Marine Administration.

9. The call signal of the station will be ....

10. The rate due to the ship will be .... öre (.............. centimes) per word, with a minimum rate of .... öre (.............. centimes) per telegram.

11. Ship stations shall be operated by one, and in the case of stations in Class I. by two or more telegraphists who must possess the certificate of the Telegraph Administration proving that they have acquired the knowledge and practice required by and in accordance with International agreements valid at any time.

Such certificate is only acquired by passing a test arranged by the Telegraph Administration. Petty Officers or men of the Signal Department of the Navy, specially trained as radiotelegraphists for the Navy, are entitled to such certificate after having satisfied the Telegraph Administration that they are thoroughly acquainted with the forwarding and sending of telegrams, and after having acquired from the Authorities concerned a testimonial to the effect that they comply with the International requirements as far as technical knowledge of the apparatus, experience, etc., are concerned.

The stations must be in charge of operators who are Norwegian citizens, unless special exemption has been granted by the Telegraph Administration, and telegraphists must be pledged to secrecy in respect of all traffic which they handle.

12. The licensee shall be responsible for the taxes which are due for the forwarding of telegrams despatched from the ship's station—that portion of the tax due to the coast-station being included.

The Telegraph Department, on the other hand, must pay to the licensee the rates due to the ship station for incoming telegrams.

The correspondence shall be entered into a journal which, together with the original telegrams despatched and receipts for telegrams received, also other documents which might be demanded, shall be forwarded to the Telegraph Administration as far as possible at the end of each month.

Settlement on taxes due to both parties shall be made quarterly or monthly, according to further agreements between the Telegraph Administration and the licensee.

With the consent of the Telegraph Administration, the licensee has a right for stations on board ships, exclusively sailing

in foreign waters, to make an agreement for special courses of settlement with the Administrations, relating to the coast stations generally used.

Besides this the Telegraph Administration may make agreements with foreign Administrations as to courses of settlement other than those mentioned above.

13. The station is subject to the control of the Department of Public Works, and will be inspected by the Officer in charge, appointed by the Department or by the Telegraph Administration. For the execution of the control the licensee will have to pay a fee, stipulated by the Department.

14. When State or other public considerations demand it, the Department for Official Works or the Marine Administration may forbid the forwarding of correspondence of any kind, in which case the licensee shall have no right to claim a compensation in this case.

The Telegraph Administration or the Marine Administration may forbid all correspondence from the station, either at certain places or at certain hours of the day when it is deemed necessary to do so in the interests of the service.

15. The Norwegian State shall be entitled, at six months' notice, to redeem the station against compensation which might be decided according to estimated value. This estimate shall be made by a Committee of three members, one to be nominated by the owner, one by the Telegraph Administration, and one by the Department of Public Works. The member nominated by the Department of Public Works shall be Chairman of the Committee. The questions submitted to the Committee shall be decided by simple majority.

If the shipowner has not nominated a member within thirty days after having been called upon to do so, or if the member nominated by him fails to attend the meeting, the estimated value (which will be binding) shall be given by the other members. In case the voting on any question is equal, the Chairman shall have right to give his casting vote.

In the estimate nothing but the technical value of the station at the time of valuation shall be considered.

The estimates shall be decided within a certain period fixed by the Telegraph Administration. The expenses in this connection will be defrayed by the Government.

16. The licence will be withdrawn—

(*a*) In case it be not utilised within one year after the issue of same;

(*b*) In case the regulations thereof are not adhered to;

(*c*) In case the ship no longer flies the Norwegian flag.

17. Disputes with reference to the interpretation of this licence shall be decided by the King, whose decision shall be final.

SCHEDULE.

1. System.	2. Type of Station.	3. Normal Range (by day).	4. Wave-lengths (The Normal Wave length to be Underlined.	5. Description of the Generating Plant.	6. Description of Transmitting and Receiving Apparatus. (Detailed Winding Diagram enclosed.)

7. Form of the Aerial. (Sketch together with Dimensions enclosed.)	8. Description of the Wireless Emergency Set. (For Ship stations of First and Second Class. Detailed by a Winding Diagram Enclosed.)	9. Remarks.

THE State Telegraph Department issued in December, 1908, the following "Notice to Mariners" applying to wireless telegraph equipments on board ships in Norwegian territorial waters:—

1. Wireless telegraph or wireless telephone stations on board foreign vessels must not be operated, except by special permission, within Norwegian territorial waters. Requests for such permission must be sent to the Telegraph Department, which will communicate its decision after conference with the Marine Department.

2. Permission to operate the stations on board foreign vessels within Norwegian territorial boundaries may be restricted to certain fixed places, or to certain fixed periods of the 24 hours. Correspondence by means of the wireless apparatus shall be at once suspended whenever it shall be so desired by the Telegraph Department, the Marine Department, or by any one of the coast stations under their authority.

3. During the stay of a vessel in a Norwegian harbour, within a distance of 5 kilometres ($2\frac{7}{10}$ths miles) from the nearest telegraph station, the station on board a foreign vessel must not be employed for telegraphing either with Norwegian or foreign coast stations. Without special

permission, the station during a vessel's stay in a Norwegian harbour must not be employed for communicating with other ship station, except for the purpose of preventing accidents.

4. The regulations above mentioned do not, however, apply to stations on board vessels of war belonging to foreign powers, which carry on mutual correspondence. Such stations are, however, bound to submit themselves to the regulations contained in the second clause of Section 2.

5. Whenever the station on board a foreign vessel is employed during her stay in Norwegian territorial waters, this shall be done subject to the regulations contained in the International Telegraph Convention, with the rules pertaining thereto.

NYASALAND PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1908.

2. No person shall establish or use any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Governor.

Any person contravening this section shall be liable on conviction to a fine not exceeding £100 or to imprisonment with or without hard labour for a term not exceeding twelve months with or without the option of a fine, and in addition any apparatus or installations in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Governor may direct.

3. The Governor in Council may from time to time make, and when made shall publish in the *Gazette*, rules prescribing the terms and conditions upon which licences to establish or use apparatus or installations for the purpose of operating wireless telegraphs may be granted, and may impose a penalty on conviction for breach of any rules so made of a fine not exceeding £50 or imprisonment with or without hard labour for a term not exceeding six months with or without the option of a fine, and such Rules may further provide for forfeiture and sale or disposal as the Governor may direct of any such apparatus or installations as aforesaid.

PORTUGAL

THE following Act was approved on June 25th, 1913:—

1. On the expiration of a period of three months from the approval of the Regulation for the execution of the present law, no Portuguese steam vessel, with accommodation for more than 50 passengers (including crew), shall be permitted to sail from any port without having

installed a wireless telegraph apparatus of the system which suits it best, in good working order, and capable of dispatching and receiving radiotelegrams within a radius of action which must never be less than 100 miles.

(*a*) From this provision those steamers are excepted which navigate only between ports situated at distances of less than 200 miles.

(*b*) For steam vessels, which navigate in the Colonies where there are coastal radiotelegraph stations, and which only occasionally come to the Metropolis, the period granted for the installation of wireless telegraphy, to which the present article refers, shall be six months.

2. The wireless telegraph material of a vessel, and the respective service of transmission and reception of radiotelegrams, shall be under the charge of one or more duly qualified telegraphists.

§ The number of telegraphists, their qualifications, and that of the indispensable auxiliary staff, the organisation of their technical instruction, provisions with respect to the service of supervision, conditions of the installation of the apparatus, and the official verification of their working, shall be determined pursuant to the Regulation drawn up for the execution of the present law.

3. It is the province of the captain of the vessel to give instructions and orders for the complete carrying out of the Laws and Regulations in force with respect to the radiotelegraphic service, and he shall exercise the necessary supervision, carrying out and causing to be carried out any provisions which he may consider advantageous for the good working of the said service.

4. The captain shall be held responsible for any negligence in complying with the requirements of Article 1, and on conviction he shall be liable to a fine not exceeding Rs. 200$000 and the suspension of his master's certificate for one year.

5. Negligence or failure on the part of the captain to carry out the provisions of Article 3 shall render him liable to a fine not exceeding Rs. 50$000, which may be accompanied with imprisonment not exceeding one month after the first offence.

6. If there should be a disaster, stranding or loss of the vessel, resulting from the lack of vigilance of the telegraph staff, and the said fault was due to the negligence of the captain in failing to carry out and causing to be carried out the provisions in force relating to the radiotelegraph service, the captain shall be liable to a fine not exceeding Rs. 200$000, accompanied or not, according to the gravity of the offence, with suspension of his certificate for a period from one to five years.

If the serious injury, or the death, of one or more persons should result from the disaster, the penalties applicable shall be

Señor A. Maria da Silva
Administrator-General, Posts and Telegraphs, Portugal.

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respectively those laid down in Articles 368 and 369 of the Penal Code.

7. The offences referred to in Articles 4, 5 and 6 constitute maritime crimes, and shall be judged by the Commercial Maritime Tribunal pursuant to the Disciplinary Code of the Mercantile Marine.

8. All the wireless apparatus intended for Portuguese vessels shall be exempt from Customs and Municipal Duty.

9. Any legislation contrary hereto is hereby repealed.

THE following regulations were issued on August 29th, 1913:

1. Ships may be equipped with any wireless telegraph apparatus which is in keeping with scientific progress.

2. The shipping or any other company may establish and work a wireless telegraph station on board ship. The station must possess a licence granted by the Government of the nationality to which the ship belongs. The "class" of the station is mentioned in the licence.

3. There are three classes:—

(*a*) Long voyage passenger steamers with accommodation for more than 150 passengers must maintain continuous service.

(*b*) The same type of steamer with accommodation for less than 150 passengers must maintain continuous *receiving* service, whereas the transmission may be limited.

(*c*) Cargo or fishing boats, or vessels carrying more than 50 persons (including crew), may have limited service.

4 and 5. Wave-lengths of 300 m, 600 m, and more than 1,800 m may be employed. Small boats may work on a 300 m wave when sending, but *600* when receiving. The waves must be as pure and as undamped as possible.

The oscillator must not be directly connected to the antenne, except in case of distress, or on certain small steamers where the energy employed in the primary does not exceed 50 watts.

6. The cabin must be divided into two parts so that the transmitting gear and the spark gap may be separated from the receiving apparatus. Double walls must be used to isolate the interior from the exterior.

7. The instruments must be able to receive and send 100 letters per minute.

8. New installations employing a power of more than 50 watts must possess such arrangements as will enable them to have a range inferior to their normal, the smallest being approximately 15 miles. All old stations must be brought to this standard as soon as possible.

9. The receiving instruments must be able to tune for waves up to 600m, being highly protected against perturbations.

10. The power measured at the terminals of the generator must not exceed 1 k.w. in normal circumstances. An increase is allowed when a

station desires to communicate with a land station other than the nearest, at a distance of more than 200 miles from the nearest land station, and when, in exceptional circumstances, the communication cannot be effected with 1 k.w.

11. First and second class steamers must carry an emergency set in as safe a place as is possible. The emergency set must be able to work for six hours at least at a distance of 80 miles for first class, and 50 miles for second class steamers.

12. The apparatus must be operated by a telegraphist who possesses a certificate from the Portuguese Government, or, in urgent cases and for one trip only, from any other Government which has signed the International Convention.

13. There are two certificates :—

(*a*) 1st Class (same as International).

(*b*) 2nd Class (12 words, adjustment of apparatus, knowledge of each instrument and its work, and rules *re* handling of telegrams).

Service.—Any member of the crew able to assist the telegraphist in his work, and possessing a knowledge of the operation of the apparatus, may be an " auxiliary " operator.

14. Second class telegraphists may be employed on board where the wireless service is only for the shipping company's requirements, or on fishing vessels, or they may act as assistants in cases where there is already one first class operator. On first class steamers *two* first class telegraphists must be employed.

15. On second class steamers, one first class and one second class telegraphist should be employed; on third class vessels one second class telegraphist will suffice.

Service.—As long as land stations do not exist in the Portuguese colonies, Portuguese steamers plying there are allowed to carry one first class telegraphist and one " auxiliary."

16. Transmitting must be performed by a first or a second class telegraphist, except in urgent cases.

17. The certificates state that the telegraphist has taken an oath of secrecy with regard to the correspondence.

18. The captain has authority over the working of the station.

19. Portuguese operators are preferred.

20. Should none be obtainable, foreigners may be employed if they are in possession of the Portuguese Government's certificate.

In urgent cases where no certificated telegraphist is available, provisional certificates may be issued for one voyage.

21. Certificates are supplied by the Commission after the examination of the telegraphist.

22 and 23. Captains are also bound by an oath of secrecy.

32. All telegrams sent and received on board must be registered by the captain on forms supplied by the Government. The date and hour of the sending or reception of these telegrams must be indicated.

33. Only the telegraphists and the captain are allowed to enter the wireless cabin.

34. The wireless room and the bridge must be connected by either a speaking tube or a telephone, unless they are within easy distance of one another

RHODESIA (SOUTHERN)

THE term "electric telegraph" whenever used in the "Electric Telegraph Act, 1861," or any law amending the same or relating to "electric telegraphs," shall be interpreted as including any system or means of conveying signs, signals, or communications by electricity, magnetism, electro-magnetism, or other like agency, and whether with or without the aid of wires; and including the system commonly known as wireless telegraphy, or aetheric signalling, and any improvements or developments of such system; and the term "line of electric telegraph" shall be interpreted as including any apparatus, instrument, mast, standard, wire, substance, matter, or thing whatever, which is, or may be, used for the purpose of sending, transmitting, conveying, or receiving such signs, signals, or communications.

2. The meaning of the term "person" shall be further extended so as to include individuals, partnerships, companies, and corporations.

3. The provision of the first section of the said Act as to its application to Southern Rhodesia shall be read and construed as including the territorial waters thereof.

4. Within Southern Rhodesia, or the territorial waters thereof, no person not thereto expressly authorised by some law shall erect or make use of any mast, standard, or apparatus of any kind, for the purpose of signalling without wires by means of electricity, magnetism, electro-magnetism, or other like agency, or shall erect or construct any line of electric telegraph, except under a licence to be granted by the Administrator.

5. The Administrator may authorise the issue of a licence for the establishment or use of any apparatus or installation for the transmission of signs, signals, or communications, by electric telegraph, with or without the aid of wires, and may revoke the same at any time, and there shall be payable annually in respect of such a licence, such sum not exceeding One Hundred Pounds sterling, as may be fixed by regulation.

6. The terms and conditions of such licence, and the duration

thereof, shall be subject to such regulations as may from time to time be made by the Administrator.

7. Any person who shall establish or use, or attempt to establish or use, any such apparatus or installation as is mentioned in Sections 1 and 4 of this Ordinance, in contravention of the provisions thereof, or of any other law relating to electric telegraphs, or of any regulation thereunder, shall be liable upon conviction to forfeit all apparatus so used, and to a penalty not exceeding Two Hundred and Fifty Pounds, and, in default of payment, to imprisonment, with or without hard labour, for a period not exceeding three months, and, in case of a second or subsequent conviction, in addition to such forfeiture to a penalty not exceeding Five Hundred Pounds, or in default of payment to imprisonment, with or without hard labour, for a period not exceeding six months.

8. Any Magistrate or Justice of the Peace before whom information shall be given on oath by credible persons, that the provisions of this Ordinance are being, or have been, or are likely to be infringed, may issue a search warrant, and authorise the seizure of any instruments, apparatus or appurtenances reasonably suspected to be intended for use in such contravention.

9. Notwithstanding the provisions of Section 4 of "The Electric Telegraph Act, 1861," all regulations made under the authority of that Act shall be published in the *Gazette*, and be subject, *mutatis mutandis*, to the provisions of Section 7 of Act No. 5 of 1883 of the Cape of Good Hope.

10. This Ordinance may be cited as the "Electric Telegraph Amendment Ordinance, 1904," and shall be read as one with "The Electric Telegraph Act, 1861," of the Cape of Good Hope, and the "Telegraph Protection Ordinance, 1901," and the said laws may be cited together as the "Electric Telegraph Laws, 1861 to 1904."

RUSSIA

THE following Statute and regulations have been adopted for the institution of an inter-departmental Radiotelegraphic Committee :—

STATUTE.

1. To establish the attached regulations concerning an inter-departmental Radiotelegraphic Committee and the necessary personnel.

2. To make Paragraph 1 effective as from July 1st, 1912.

3. To allot for the expenses of the said Committee (13,200 roubles annually) from the Imperial Treasury commencing from the year 1913 and to debit the expenses for 1912 (amounting to 6,600 roubles) to the anticipated surplus on the estimates for 1912.

REGULATIONS.

1. An inter-departmental Committee is instituted for the co-ordination of the work of the various departments relating to the existence and use of the Imperial network of radiotelegraphic and radiotelephonic stations and for the consideration of schemes for the establishment and maintenance of radiotelegraphic and radiotelephonic communication which require preliminary discussion between the departments affected thereby.

This Committee is attached to the Headquarters Staff of the Postal Telegraph Department.

2. The Committee shall consist of a President and of permanent members appointed by the Ministries of the Interior of War, Routes of Communication and of Foreign Affairs. When schemes for the establishment and exploitation of radiotelegraphic and radiotelephonic stations for the use of the Ministry of Finance or other departments are under consideration representatives of the department in question shall be appointed to attend the meetings of the Committee and have the right to vote.

When legal aspects of radiotelegraphic and radiotelephonic communication are under discussion a representative of the Ministry of Justice shall be invited to attend and shall have the right to vote.

The Ministries of the Interior, of War, of Marine, of Routes of Communication and of Commerce and Industries shall each appoint two members to the Committee and the Ministry of Foreign Affairs shall appoint one member.

3. When necessary the Ministry of the Imperial Court shall appoint two representatives to attend the meetings of the Committee and the Ministry of Justice or other Ministries shall each appoint one member.

In the event of the representative of any of the Ministries being unable to attend the meetings of the Committee the Ministry in question may appoint a temporary substitute.

4. The President of the Committee and one of the permanent members of each department that furnishes two members must have special scientific and technical knowledge, and any temporary substitute appointed to represent these must be in possession of the same qualifications.

The President of the Committee shall be appointed by His Imperial Majesty on the recommendation of the Minister of the Interior and the members of the Committee.

Understudies need not be of equal rank with the members for whom they act as substitutes.

During the absence of the President the fulfilment of his duties shall devolve upon one of the members appointed by the Ministry of the Interior.

5. The duties of the Committee are as follows :—

(*a*) The examination of schemes which have been worked out by the various departments for radiotelegraphic and radiotelephonic installations with the object of co-ordinating them and of fitting them into a general plan for a network of radiotelegraphic and radiotelephonic stations throughout Russia.

(*b*) The regulation of the mutual relations between the radiotelegraphic and radiotelephonic stations of different departments during their operations.

(*c*) The examination of matter relating to communication between ship and shore stations.

(*d*) The consideration of proposals made by various departments for the issue of new laws, rules and regulations concerning radiotelegraphic and radiotelephonic communication.

(*e*) The preparation of materials and questions to be brought forward by Russia for discussion at International Radiotelegraphic and Radiotelephonic Conferences.

(*f*) The drafting of general technical regulations, rules and standards relating to radiotelegraphic and radiotelephonic installations.

(*g*) The investigation of the general requirements of Russia in the matter of specialists in radiotelegraphy and telephony, and in the matter of their education and of the right to radiotelegraphic and radiotelephonic communication.

(*h*) Action as consultants in connection with questions concerning radiotelegraphic and radiotelephonic communications which may be referred to the Committee by various departments and particularly the examination of and reporting upon the practical value of new inventions relating to radiotelegraphy and radiotelephony.

(*i*) All other matters and questions concerning radiotelegraphic and radiotelephonic communication.

6. All matters and questions relating to radiotelegraphic and radiotelephonic communication enumerated in Sections *a* to *e* and *h* of the preceding paragraph (5) shall be brought forward by the various departments for the decision of the Committee.

Matters indicated in Sections *f*, *g* and *i* of the same paragraph shall be examined by the Committee either on their own initiative or at the request of the departments interested.

7. Matters shall be submitted to the Committee in accordance with the instructions and resolutions of Ministers or Commanders-in-Chief in a complete form and with a definitely worded request from the department.

8. Communications between the President of the Committee and

the Senate or the Chiefs of Headquarters or Chiefs of departments or their subordinates or Governors shall be made in accordance with Clauses 233-236 of the Institution of Ministries.

9. For the preliminary technical consideration of complicated affairs the Committee shall be empowered to appoint, when required, special sub-committees consisting of members of the Committee who are particularly concerned in the matter and of well-informed persons who may be invited by the Committee and who will have the right to vote at the meeting of the sub-committees. At such meeting a member chosen by the Committee will preside.

10. For the carrying out of scientific and technical researches the Committee shall be permitted to use the laboratories of the Chamber of Weights and Measures and of other institutions in St. Petersburg, under conditions to be defined by special agreement between the Ministry of the Interior and other Ministries.

11. The final preparation and presentation of affairs to the Committee will be performed by one of the permanent members. Matters of a departmental character will be presented by a representative of the Ministry responsible for bringing the matter before the Committee for consideration.

12. The Committee will meet, by order of the President, at the Headquarters of the Postal Telegraph Department, not less than once per month, with the exception of the summer holiday season, when meetings will be convened as required.

13. To form a quorum at meetings, the attendance is required of the representatives of the department which has introduced the business under discussion, and of at least one permanent member each from the Ministries of the Interior, of War, of Marine and of Commerce and Industries.

14. All affairs in the Committee shall be decided by a simple majority of votes, each department having only one vote through its representatives. At meetings of sub-committees questions shall be decided by a simple majority of votes of all members of the sub-committee, including experts who may have been invited to attend the meetings.

In case of the votes of two parties being equal, the President shall give the casting vote.

15. In case of a department disagreeing with a decision of the Committee, the latter may, if they consider it necessary, refer the matter to the Council of Ministers.

16. In connection with each matter examined by the Committee a short protocol must be prepared and signed at the same meeting by all members of the Committee who are present. Independently of the protocols detailed journals of the meetings will be kept and these

will include the opinions of the Committee concerning the business under consideration. In case of a division of votes the protocol and the journal must contain the opinions both of the majority and the minority, together with a statement as to the Ministries which were included in each party.

17. The originals of journals and protocols will be kept with the documents of the Committee, but copies of the journals must be communicated within seven days to the Chiefs of Headquarters and to Chiefs of sections of those departments which are represented on the Committee.

18. The procedure to be followed in bringing matters before the Committee must be decided by the Committee and confirmed by the Minister of the Interior by agreement with other Ministers concerned.

19. The secretarial work in connection with the Committees shall be carried out by the secretary of the Committee, by his assistant, and by the officials allotted for the clerical work of the Committee.

20. The Secretary of the Committee shall be chosen by its President, whose choice must be confirmed by the Minister of the Interior. The appointment of the assistant secretary is confirmed by the President of the Committee. Only persons who have received a University education and who have a technical knowledge of radiotelegraphy and radiotelephony will be qualified to hold such posts.

The following are the principal provisions of the Decree concerning wireless telegraphy in Russia of February 20th, 1908:—

By a "radiotelegraphic station" is understood every installation designated for telegraphic communications and capable of producing on the spot or receiving from a distance electro-magnetic waves.

Stations of this kind comprise:—

1. Stations designated for a special use.
2. Stations designated for a general use, that is to say, open to accept telegrams from the public.

The form of administration, working, and supervision of radiotelegraphic stations are regulated by the personnel of the Telegraph Service, except in the case of the special and supplementary provisions to be eventually fixed.

The establishment of radiotelegraphic stations for public use and the general management of the Radiotelegraphic Service of the Empire are under the jurisdiction of the General Direction of Posts and Telegraphs, to which likewise belongs the direction of the establishment of the aforesaid stations by the various Government departments, with all questions affecting their destination, power, range, and technical construction.

The carrying out by scientific associations and schools of public instruction of scientific experiments and researches in radiotelegraphy

is subject to an authorisation, by special request, of the Minister for the Interior. These experiments, as well as the working of radio-telegraphic stations for purposes of instruction, can be interdicted in cases where such experiments and instructions would exercise a harmful influence on neighbouring radiotelegraphic stations, or, in general, prejudice the interests of others.

Stations on board ships anchored in ports, or sailing near the coasts, are subjected to special regulations decreed by the Minister for the Interior in common accord with the Ministers of War, of the Marine, of Ways and Communications, of Foreign Affairs and of Commerce and Industry.

SAINT HELENA

THE following Ordinance provides for the regulation of wireless telegraphy :—

1. From and after the passing of this Ordinance the Governor-in-Council may make regulations as he may deem requisite for regulating the use of wireless telegraphy on merchant ships whether British or foreign while in the territorial waters of this Colony.

2. The Master of any ship and any person who shall act in contravention of any regulation now published or which may hereafter be published shall be liable on conviction to a penalty not exceeding ten pounds.

3. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1912."

Regulations.

Made by the Governor-in-Council under Ordinance No. 7 of 1912, entitled "An Ordinance to provide for the Regulation of Wireless Telegraphy."

(1) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of this Colony shall be worked in such a way as not to interfere with (*a*) naval signalling or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of this Colony except with the special or general permission of the Governor.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of

messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases as may be deemed desirable.

(4) These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

SAINT LUCIA

Wireless Telegraphy Ordinance

No. 10 of 1912.

THIS Ordinance may be cited as the Wireless Telegraphy Ordinance, 1912.

2. In this Ordinance "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (*a*) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(*b*) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations under this Ordinance.

5. (*a*) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(*b*) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(*c*) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony

shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any police officer or any person appointed in that behalf by the Chief of Police and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used for wireless telegraphy therein.

7. (*a*) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(*b*) Proceedings shall be taken before the First District Court on the complaint of the Chief of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraph Ordinance, 1903, is hereby repealed.

SCHEDULE—SECTION 5 (2).

Regulations

ALL apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof; and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships

of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in charge or command of the ship.

6. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Passed the Legislative Council this 25th day of November, 1912.

SAINT VINCENT

18th February, 1904.

In this Ordinance the term "Wireless Telegraphy" means any system or installation designed or constructed for the transmission or receipt of any messages or communications to or from a distant place by means of electric currents and signals generated by any apparatus or instrument, which system, installation or instrument is unconnected by wire or other tangible attachment with such distant place. The term "Wireless Telegram" means any message or communication transmitted, or intended for transmission, by Wireless Telegraphy.

2. The Governor in Council and the servants of the Government of the Colony, shall have the exclusive privilege of installing, erecting, maintaining and using in this Colony apparatus intended for Wireless Telegraphy, and also the incidental services of transmitting, receiving, collecting or delivering Wireless Telegrams.

3. It shall not be lawful for any person to instal, erect, maintain or use in this Colony any apparatus or instrument for the purpose of Wireless Telegraphy without having previously obtained from the Governor a licence in that behalf to be granted on such terms and conditions as the Governor may prescribe.

4. Any person contravening the provisions of this Ordinance shall be liable on conviction to a fine not exceeding Fifty Pounds or in

default of payment thereof to imprisoment with or without hard labour for any term not exceeding four months, and the apparatus and installation in respect of which a conviction is obtained may, by order of the Magistrate before whom such conviction is obtained, be forfeited to the use of His Majesty the King.

5. All proceedings under this Ordinance may be taken before the Magistrate of the First District or any other person appointed by the Governor for the purpose of hearing and deciding the case; and the mode of procedure shall be according to the law in force for the time being regulating the proceedings before Justices.

6. This Ordinance may be cited as "The Wireless Telegraph Ordinance, 1904."

AN ORDINANCE TO AMEND THE WIRELESS TELEGRAPHY ORDINANCE, 1904.

1. (1) This Ordinance may be cited as "The Wireless Telegraph Amendment Ordinance, 1912," and shall be read as one with "The Wireless Telegraph Ordinance, 1904," and may be cited therewith as the Wireless Telegraph Ordinances, 1904 and 1912.

(2) "The Wireless Telegraph Ordinance, 1904," is herein referred to as the principal Ordinance.

2. The Governor in Council may make regulations—

(*a*) Prescribing the form and manner in which applications for licences under the principal Ordinance are to be made and the fees payable on the grant of any such licence;

(*b*) Governing the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in the territorial waters of the Colony; and

(*c*) Generally for the purpose of carrying the principal Ordinance into effect.

3. Any person committing a breach of any regulation made under this Ordinance shall be liable, on summary conviction, to a fine not exceeding £20.

SEYCHELLES ISLANDS

NO telegraphic or electrical station, apparatus, machinery, or implements whatsoever, whether for the purpose of electrical communications by what is generally known as "wireless telegraphy," or for any other purpose connected with the transmission, emission, or reception of messages between the Seychelles Islands and any place within or outside the Seychelles Islands, shall be erected or used in any place in the Seychelles Islands, whether on private property or not, without the sanction of the Administrator previously obtained.

(2) The Administrator may refuse such sanction or grant it under such conditions or restrictions as he may think fit.

(3) The word "place" in sub-section (1) shall include any ship or floating conveyance within or without the Seychelles waters, except vessels of His Majesty's Navy.

2. Any person contravening any of the provisions of this Ordinance shall be guilty of an offence and shall be liable, on prosecution before the Court of Seychelles, to a fine not exceeding 5,000 rupees (Rd. 5,000), and every apparatus, machinery, or implement used in, or connected with, the commission of the offence shall be forfeited.

3. The Court may further order, on the application of the Crown Prosecutor, or of any person authorised by the Administrator to that effect, the immediate destruction, pulling down, or removal of any building, apparatus, machinery, or implements used in the commission of the offence.

4. All prosecutions against this Ordinance shall be instituted at the instance of the Crown Prosecutor or Inspector of Police or any person authorised by the Administrator to that effect.

5. This Ordinance may be cited as "The Telegraphic and Electrical Stations Ordinance, 1903."

SIERRA LEONE

An Ordinance to amend "The Wireless Telegraph Ordinance, 1903," Regulations.

No. 19 of 1912.

Be it enacted by the Governor of the Colony of Sierra Leone, with the advice and consent of the Legislative Council thereof, as follows:—

1. This Ordinance may be cited as the Wireless Telegraphy Amendment Ordinance, 1912.

2. (1) A person shall not work any apparatus for wireless telegraphy installed on a merchant ship, whether British or foreign. whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with the regulations contained in the Schedule to this Ordinance.

(2) The Governor-in-Council may amend, vary or revoke any of the regulations contained in the Schedule to this Ordinance and may make any other regulations, and such last-mentioned regulations shall be of the same effect as if they were contained in this Ordinance.

3. Any person acting in contravention of any regulation contained in or made under this Ordinance, shall be guilty of an offence and, on summary conviction thereof, shall be liable to a penalty not exceeding One hundred pounds, or to imprisonment, with or without hard labour, for any period not exceeding Twelve calendar months.

The Schedule.

(1) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, or in the Protectorate, and in particular, the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony, except with the special or general permission of the Governor.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships, while in the territorial waters, shall be subject to such further rules as may be made by the Governor-in-Council from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

(4) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Passed by the Legislative Council the 22nd of November, 1912.

SOMALILAND PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphs Ordinance, 1908."

2. No person shall use or establish any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Commissioner.

Any person contravening the terms of this section shall be liable on conviction to a fine not exceeding £100, or to imprisonment for a term not exceeding twelve months with or without hard labour; and any apparatus or installation in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Commissioner may direct.

3. It shall be lawful for the Commissioner from time to time by rules to prescribe the terms and conditions upon which licences to use or establish apparatus or installations for the purpose of operating wireless telegraphs may be granted.

SPAIN

SPAIN has shown a keen interest in the developments of wireless telegraphy, for in 1899 sub-commissions were appointed by the Council of State of National Defence, which issued their periodical reports to the Spanish Government; and in 1905, by Royal Decree of May 21st, a Royal and permanent Commission was created, under the presidency of the Chief of the General Staff, comprising representatives of the War, Navy and the Interior Ministries, previous to the Berlin Convention of Wireless Telegraphy of 1906.

By Royal Order of the President of Ministers and Minister of War of February 9th and 17th, 1907, respectively, the Cortes of Spain were recommended to pass a law for establishing a wireless system for communication in Spain, which law was promulgated on October 26th, 1907, followed by a Royal Decree of January 24th, 1908, declaring of national interest "the construction and erection of a net of wireless stations in the Peninsula and Canary and Balearic Islands, in order to carry out wireless communication between ships and shore stations, between the Balearic and Canary Islands and the Peninsula, Inland and International services." In the same year a public company was formed; their tender was accepted and a concession granted for the installation of a number of stations and exploitation of the wireless service, for a term of 21 years and 8 months. The contract for this important net of wireless stations was successfully carried out and is in course of completion by Marconi's Wireless Telegraph Company, Limited, for the Compania Nacional de Telegrafia sin Hilos.

In October of 1909 the Minister of Public Works called for public tenders for the carrying of mails by steamer between Spain and its possessions in Africa, as well as to Central and South American countries, stipulating in the conditions of the tender that the ships of the firms tendering for the mail service should be provided with wireless apparatus—not only those carrying passengers, but also those carrying cargo and passengers; for the former the law to be in force from the date of accepting the tender, and the latter from January 1st, 1913.

The following Royal Decree was issued during the past year:—

1. That from the first day of August, 1912, all Spanish mercantile ships shall be fitted with wireless telegraph apparatus, provided (*a*) they

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are engaged in carrying passengers or mails, and (*b*) that they carry more than fifty persons on board during a transatlantic voyage, including in this number the crew.

2. The wireless telegraph apparatus shall have the necessary efficiency and be erected according to the instructions contained in the regulations issued by the Ministry of the Interior and the General Direction of Posts and Telegraphs, in order to put into force the Royal Decree of January 24th, 1908, and as a consequence of the International Congress of Berlin signed by the representatives of Spain on November 3rd, 1906.

3. This Royal Decree shall be communicated to the shipping companies, pointing out that wireless telegraph stations on board have to be approved by the Department.

4. The shipping companies shall communicate with this centre through the harbour authorities when the installation has been completed and is in a position to work efficiently, so that a technical commission may recognise and test it in order to issue a complete report of same, and to add the said report to the action with a view to finally sanctioning the service, according to previous permission of the War Office and of the Home Office.

A Bill was also submitted before the Spanish Cortes to the effect that "no passenger shall embark in Spanish ports on any ship which has not been provided with wireless apparatus, the maritime authorities only granting the necessary authorisation after ascertaining the good working order of the apparatus." This Bill did not become law, but we understand that a further attempt will be made to give effect thereto.

A BILL was passed into law which provides for the organisation of a school of Wireless Telegraphy, with the object of instructing pupils, whether already in the telegraph service or not, in the theory and practice of radiotelegraphy, and to fit them for service either on shore or ship stations of private companies.

There will be three courses of study, the first one lasting six months. The pupils will then have to pass a test consisting of the transmission of at least 20 words per minute for not less than five nor more than ten minutes, with an allowance of 1 per cent. of uncorrected mistakes.

The second course will last three months, and will comprise a course of study of the apparatus used in radiotelegraphy, the tuning of same for different wave lengths, commutations, etc., the regulations regarding the exchange of wireless messages, and the adjustment of slight irregularities.

A higher and final course will also be given for those wishing to further pursue their studies. Foreign languages also figure in the curriculum of the school.

STRAITS SETTLEMENTS

ORDINANCE 25, dated 16th December, 1912, provides for the regulation of Wireless Telegraphy :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1912."

2. The expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraph Ordinance, 1895," without the aid of any wire connecting the points from and at which the messages or other communications are sent or received:

Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, licence the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor in Council may determine, and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Public Prosecutor.

(2) If a magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to

enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor in Council may make regulations for all or any of the following matters:—

(*i.*) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(*ii.*) for prescribing the fees payable on the grant of any licence;

(*iii.*) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*iv.*) for prohibiting, except with the special or general permission of the Postmaster-General of the Colony the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the Colony;

(*v.*) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Colony the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time, and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (*iii.*) (*iv.*) and (*v.*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted, subject to such special terms, conditions and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder, or in breach of the conditions and restrictions subject to or upon which any licence has been issued, shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine of five hundred dollars.

(2) All convictions, forfeitures and fines under this Ordinance or any Regulations made thereunder may be had and recovered before a district court.

SWEDEN

THE Act of August 31st, 1907, concerning the establishment and working of installations of radio-telegraphy and radio-telephony reads as follows:—

1. Whomsoever desires to establish in Sweden, on land, or on board a vessel permanently moored in Swedish waters, an electric installation of radio-telegraphy or radio-telephony for public or private use, must apply for an authorisation from the King.

2. The authorisation of the King must likewise be applied for, by any person or persons desiring to establish on board a Swedish vessel other than permanently moored, an installation of the kind referred to in Paragraph 1.

3. The authorisation granted by the King, as prescribed in Paragraphs 1 and 2, can only be granted for a certain period. In granting the authorisation, His Majesty prescribes, under the reservation of private rights, the manner and conditions under which the installation may be established and worked.

4. Whomsoever establishes or works, without the authorisation of the King or contrary to the provisions prescribed in the authorisation, an installation within the meaning of the present law, is liable to a fine of from 25 to 1,000 kronen if the penalty incurred by this contravention is not included in the Penal Code.

5. If an installation within the meaning of the present law has been established without the authorisation of the King, or contrary to the provisions prescribed simultaneously with the authorisation, or if the authorisation has been revoked later by the King, it is the duty of the Governors of Provinces to take the necessary steps to prevent any use being made of the installation.

6. Every fine imposed under the present law reverts to the State. Fines not paid on account of the insolvency of the delinquent are expurgated by terms of imprisonment as prescribed in the Penal Code.

7. The provisions of this law do not apply to State installations.

8. Regulations concerning foreign vessels not permanently moored in Swedish waters, and all dispositions which may be considered necessary for the proper working in Sweden of installations within the meaning of this Act, are made by the King.

THE following Royal Decree of June 20th, 1913, which came into force on July 1st, 1913, replaces that of August 31st, 1907 (see YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, pp. 151-2):—

1. The working of installations of radio-telegraphy or radio-telephony on board a foreign vessel not permanently moored in Swedish waters is, except in cases of distress, prohibited in those parts of the Swedish Archipelago and Swedish waters near to the coast stations which shall be designated by the Direction General of Telegraphs acting conjointly with the Admiralty.

It is the duty of the Direction General of Telegraphs, acting conjointly with the Admiralty, to communicate these provisions to navigators in the way he judges most convenient, and likewise to inform the Government Department concerned.

2. In order to exploit such stations in a Swedish port on board foreign vesels above referred to a special authorisation of the General Direction of Telegraphs, acting in conjunction with the Admiralty, must be obtained; the parties interested shall furthermore be bound to conform to the instructions, detailed edicts, if necessary, made by the Direction General of Telegraphs.

3. When an installation of the kind referred to above is exploited on board one of the foreign ships above-mentioned, the interested parties, if no regulation exists to the contrary, shall conform to the instructions fixed by the International Radio-telegraphic Convention which are in force with the service regulations thereto annexed.

4. Every contravention of this Decree, or of the regulations prescribed by the Direction General of Telegraphs in virtue of Article 2 above, will be subject to a fine of 25 to 1,000 kronen.

The fines revert to the State. Fines not payable by reason of the insolvency of the delinquent are expurgated by terms of imprisonment as laid down in the Penal Code.

5. The provisions of Article 4 hereof shall not apply to vessels of war.

THE following resolution made by the Direction General of Telegraphs relating to the prohibition of working radio-telegraphic and radio-telephonic installations in proximity to Swedish coast stations was issued on August 22nd, 1913:—

In view of the Royal decision relating to the installing of wireless stations on board of certain Swedish vessels:

In view of the Royal Order of June 20th, 1913, relating to the working in Sweden of radio-telegraphic and radio-telephonic installations on board foreign vessels:

The Direction General of Telegraphs, conjointly with the Admiralty, brings to the notice of interested parties that within a radius of ten nautical miles from the nearest Swedish coast station the operation of radio-telegraphic or radio-telephonic stations established either on board of Swedish vessels or on board of foreign vessels is prohibited during the hours when such coast station is open for traffic, except in cases of distress or for the purpose of corresponding with the nearest coast station.

This resolution does not refer to ships of war.

UGANDA PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphs Ordinance, 1908."

2. No person shall use or establish any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Governor.

Any person contravening the terms of this section shall be liable on conviction to a fine not exceeding Rs. 1,500 or to imprisonment of either kind for a term not exceeding twelve months, and any apparatus or installation in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Governor may direct.

3. It shall be lawful for the Governor from time to time by rules to prescribe the terms and conditions upon which licences to use or establish apparatus or installations for the purpose of operating wireless telegraphs may be granted.

UNITED STATES OF AMERICA

THE following "Act to Require Apparatus and Operators for Radio Communication on certain Ocean Steamers," which was approved on July 23rd, 1912, amends Section 1 of the Act approved June 24th, 1910:—

1. That from and after October 1st, 1912, it shall be unlawful for any steamer of the United States or of any foreign country navigating the ocean or the Great Lakes and licensed to carry, or carrying, fifty or more persons, including passengers or crew or both, to leave or attempt to leave any port of the United States unless such steamer shall be equipped with an efficient apparatus for radio communication, in good working order, capable of transmitting and receiving messages over a distance of at least 100 miles, day or night. An auxiliary

power supply, independent of the vessel's main electric power plant, must be provided which will enable the sending set for at least four hours to send messages over a distance of at least 100 miles, day or night, and efficient communication between the operator in the radio room and the bridge shall be maintained at all times.

The radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated. Such equipment, operators, the regulation of their watches, and the transmission and receipt of messages, except as may be regulated by law or international agreement, shall be under the control of the master, in the case of a vessel of the United States; and every wilful failure on the part of the master to enforce at sea the provisions of this paragraph as to equipment, operators, and watches shall subject him to a penalty of $100.

That the provisions of this section shall not apply to steamers plying between ports, or places, less than 200 miles apart.

2. That this Act, so far as it relates to the Great Lakes, shall take effect on and after April 1st, 1913, and so far as it relates to ocean cargo steamers shall take effect on and after July 1st, 1913: Provided, that on cargo steamers, in lieu of the second operator provided for in this Act, there may be substituted a member of the crew or other person who shall be duly certified and entered in the ship's log as competent to receive and understand distress calls or other usual calls indicating danger, and to aid in maintaining a constant wireless watch so far as required for the safety of life.

The remaining sections of the Act of June 24th, 1910, which are unchanged, read as follows:—

2. That for the purposes of this Act apparatus for radio communication shall not be deemed to be efficient unless the company installing it shall contract in writing to exchange, and shall, in fact, exchange, as far as may be physically practicable, to be determined by the master of the vessel, messages with shore or ship stations using other systems of radio communication.

3. That the master or other person being in charge of any such vessel which leaves or attempts to leave any port of the United States in violation of any of the provisions of this Act shall, upon conviction, be fined in a sum not more than $5,000, and any such fine shall be a lien upon such vessel, and such vessel may be libelled therefor in any district court of the United States within the jurisdiction of which such vessel shall arrive or depart, and the leaving or attempting to leave each and every port of the United States shall constitute a separate offence.

4. That the Secretary of Commerce and Labour shall make such regulations as may be necessary to secure the proper execution of this Act by collectors of customs and other officers of the Government.

Regulations

1. *Administration.*

1. The Department has established for the purpose of enforcing, through radio inspectors and others, the Acts relating to radio communication and the International Convention, the following districts with the principal office for each district at the custom house of the port named:

(1) Boston, Mass.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

(2) New York, N. Y.—New York (county of New York, Staten Island, Long Island, and counties on the Hudson River to and including Schenectady, Albany, and Rensselaer) and New Jersey (counties of Bergen, Passaic, Essex, Union, Middlesex, Monmouth, Hudson, and Ocean).

(3) Baltimore, Md.—New Jersey (all counties not included in second district), Pennsylvania (counties of Philadelphia, Delaware, all counties south of the Blue Mountains, and Franklin County), Delaware, Maryland, Virginia, District of Columbia.

(4) Savannah, Ga.—North Carolina, South Carolina, Georgia, Florida, Porto Rico.

(5) New Orleans, La.—Alabama, Mississippi, Louisiana, Texas, Tennessee, Arkansas, Oklahoma, New Mexico.

(6) San Francisco, Cal.—California, Hawaii, Nevada, Utah, Arizona.

(7) Seattle, Wash.—Oregon, Washington, Alaska, Idaho, Montana, Wyoming.

(8) Cleveland, Ohio.—New York (all counties not included in second district), Pennsylvania (all counties not included in third district), West Virginia, Ohio, Michigan (Lower Peninsula).

(9) Chicago, Ill.—Indiana, Illinois, Wisconsin, Michigan (Upper Peninsula), Minnesota, Kentucky, Missouri, Kansas, Colorado, Iowa, Nebraska, South Dakota, North Dakota.

2. Radio inspectors are authorised to communicate directly in their respective districts with collectors of customs, and to co-operate with them in the enforcement of the laws.

3. The radio inspectors and customs officers, as far as practicable, shall visit steamers subject to the Act, before they leave port, and ascertain if they are equipped with the apparatus in charge of the operators prescribed by the Act.

4. Where a steamer subject to the Act is without the apparatus and the operators prescribed, or either of them, and is about to

attempt to leave port, the radio inspector or customs officer visiting the vessel shall—

(*a*) Notify the master of the fine to which he will be liable, and of the particulars in respect of which the law has not been complied with;

(*b*) notify at once the collector of customs, if necessary by telephone;

(*c*) the radio inspector or customs officer shall submit to the collector of customs of the port a written report stating the exact nature of the violation, the section of the law violated, and the penalties involved, and all of the circumstances in connection therewith which will be of service to the collector and to the Secretary of Commerce in determining what action shall be taken;

(*d*) statements should be obtained from operators, ship officers, or other witnesses at the time the violation is discovered and should accompany the report to the collector of customs;

(*e*) the collector of customs will report the case to the Secretary of Commerce in the usual manner as a navigation fine case.

5. The Act does not authorise the refusal of clearance in case of violation of its provisions, but specifically provides for the imposition of a fine in a sum not more than $5,000.

6. The Act does not apply to a vessel at the time of entering a port of the United States. Radio inspectors and customs officers may, however, accept as evidence of the efficiency of the apparatus and the skill of an operator messages shown to have been transmitted and received by him over a distance of at least 100 miles, by day, during the voyage to the United States.

7. Collectors of customs and radio inspectors are enjoined that the reports required by paragraph 4 (*c*) of these regulations must be precise statements of the facts as the basis for proceedings by the United States Attorney.

8. Violations by the master of a vessel of the United States of the provisions of the second paragraph of Section 1 will be reported to the collector of customs directly and the usual procedure in cases of fines and penalties will be followed.

2. *Operators.*

1. In so far as licensed operators are concerned, a sharp distinction should be drawn between the Act of July 23rd, 1912, which requires apparatus and operators for radio communication on steamers, and the Act of August 13th, 1912, to regulate radio communication.

The Act of July 23rd, 1912, amending the Act of June 24th, 1910, is designed to promote safety at sea through the employment of apparatus and operators to transmit and receive distress calls and other calls relating to perils and aids to navigation. It provides that in the case of American and foreign vessels subject to its provisions "the radio

equipment must be in charge of two or more persons skilled in the use of such apparatus." This Act does not require that the operators shall be licensed, and the penalty prescribed in Section 3 of the Act is not incurred by the master of a vessel whose operators are "skilled in the use of such apparatus," even though they may not be licensed.

The Act of August 13th, 1912, is designed to execute in behalf of the United States the International Radiotelegraphic Convention and thus to promote orderly exchanges by radio communication. For this purpose the International Radiotelegraphic Convention (Service Regulations) provides that the service of the station on shipboard shall be carried on by a telegraph operator holding a certificate issued by the Government to which the vessel is subject.

Section 3 of the Act of August 13th, 1912, carries out this provision of the International Convention by providing licences for operators on American vessels. If an unlicensed person serves in charge or in supervision of the use and operation of the apparatus both he and his employer are liable to a fine of not more than $100 or imprisonment for not more than two months or both. This section and penalty do not apply to operators on foreign ships. But operators on the ships of foreign nations signatory to the International Radiotelegraphic Convention, as shown above, are required to have certificates or licences from their own Governments, and if not so certificated, the obligations of the convention have not been observed. The convention in the Service Regulations provides for this situation.

The Act of July 23rd, 1912, as stated, requires that on American and foreign ships the operators must be "skilled in the use of such apparatus," but does not require that they must be licensed. To facilitate commerce and simplify administration, operators presenting American licences or foreign certificates are accepted as "skilled in the use of such apparatus," except where there may be special reasons to doubt the operator's skill or reliability. Where operators on American or foreign ships do not have such licences or foreign certificates, radio inspectors or customs officers under the Act of July 23rd, 1912, may accept other competent evidence of skill or may examine such operators.

2. The Service Regulations of the International Convention require that—

> The service of the station on shipboard shall be carried on by a telegraph operator holding a certificate issued by the Government to which the vessel is subject.

Such certificate shall attest the professional efficiency of the operator as regards—

(*a*) Adjustment of the apparatus and knowledge of its functioning.

(*b*) Transmission and acoustic reception at the rate of not less than 20 words a minute (Continental Morse) for commercial first-grade operators and not less than 12 words per minute for second-grade operators.

(*c*) Knowledge of the regulations governing the exchange of wireless telegraph correspondence.

(*d*) The certificate shall furthermore state that the Government has bound the operator to secrecy with regard to the correspondence.

3. The International Convention has been ratified by the principal maritime nations, dominions, and provinces. Radio operators holding valid certificates issued by foreign Governments which are parties to the convention will be recognised by this Department as persons "skilled in the use of such apparatus" within the meaning of the Act, unless in the case of a specific individual there may be special reason to doubt the operator's skill and reliability. Such certificates should be ready at hand for the inspection of radio inspectors or customs officers before the steamer departs from the United States.

4. In the case of a vessel subject to the Act under the flag of any nation not a party to the International Convention, the radio operator, before the departure of the vessel from the United States, must furnish to the inspector evidence that he is "skilled in the use of the apparatus." This evidence shall consist of an examination on board by the radio inspector.

5. The Department of Commerce issues licences to radio operators certifying the degree of knowledge of radio-telegraphy possessed by them and their ability as operators, under the International Convention. Examinations for operators' licences can be taken at the following points: The United States Navy Yards at Boston, Mass., Brooklyn, N. Y., Philadelphia, Pa., Washington, D. C., Norfolk, Va., Charleston, S. C., New Orleans, La., Mare Island (San Francisco), Cal., Puget Sound, Wash.; at the naval stations at Key West, Fla., San Juan, P. R., and Honolulu, Hawaii; at the Naval Academy, Annapolis, Md., and the United States Naval Radio Station at Colon, Republic of Panama; also at Fort Sam Houston, San Antonio, Tex., Fort Wood, New York Harbour, Fort Omaha, Nebr., Fort Leavenworth, Kans.; Fort Mason, San Francisco, Cal.; School for Enlisted Specialists, Fort Monroe, Va.; at the Army stations at St. Michael and Fairbanks; and by special arrangement at the Army stations at Fort Gibbon and Valdez, Alaska; also at the Bureau of Standards, Washington, D. C.; and by the Department's radio inspectors at the custom houses in their districts and elsewhere, if practicable, by arrangement with them.

Applicants for licences should communicate in advance with the commandants or commanding officers of the Navy yards or Army posts or Naval or Army stations named, or with the Director of the Bureau of Standards, or with the radio inspectors at the custom houses in regard to examinations. In emergencies arrangements for the examination of ship operators can be made on short notice with the naval stations or radio inspectors in different ports. An effort should be made to arrange beforehand for any desired examination.

The operators' licences will be delivered to the successful applicants at the time of examination, or as soon thereafter as possible. The operator's licence is not valid until the oath has been accomplished.

The licence provides that the holder shall take the oath for the preservation of the secrecy of messages before a notary public or other officer authorised to administer oaths.

6. The requirements which applicants must meet to secure licences of the several grades and scope and limitations of employment authorised by the licences of the several grades are as follows :—

Commercial first grade.—The applicant must pass a satisfactory examination in—

(*a*) The adjustment, operation, and care of the apparatus, including correction of faults and change from one wave to another.

(*b*) Transmitting and receiving by ear at a speed of not less than 20 words a minute in Continental Morse Code (five letters to the word).

(*c*) Use and care of storage battery or other auxiliary power apparatus.

(*d*) Knowledge of the international regulations applying to radio communication in force.

(*e*) Knowledge of requirements of the Acts of Congress to regulate radio communication.

Commercial second grade.—The applicant must pass a satisfactory examination in all the subjects prescribed above for the first grade, with the exception that the minimum speed in transmitting and receiving shall be not less than 12 words in Continental Morse Code, and the examination in the subjects will not be as comprehensive as that given first-grade operators.

Commercial cargo grade.—The examination should be conducted so as to determine the following facts :—

(1) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the distress signal (SOS) when included in a list of other words or signals sent slowly (approximately five words a minute).

(2) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the radio call letters of the vessel on which he desires to operate, when sent slowly and repeated several times.

(3) That the applicant is sufficiently familiar with the type of receiving apparatus of the vessel on which he desires to operate to determine by a buzzer or similar test that the detector or receiving apparatus is properly adjusted to receive signals.

Amateur first grade.—The applicant must have a sufficient knowledge of the adjustment and operation of the apparatus *which he wishes to operate,* and of the regulations of the International Convention and

Acts of Congress in so far as they relate to interference with other radio communications, and impose certain duties on all grades of operators. The applicant must be able to transmit and receive in Continental Morse at a speed sufficient to enable him to recognise distress calls or the official "Keep out" signals. A speed of at least five words per minute must be attained (five letters to the word).

7. Ship stations on vessels of the United States are classed under the Act of August 13th, 1912, as follows:—

Class A.—Ocean passenger steamers which are required to carry at least two operators and maintain a constant skilled watch. On vessels of this class carrying or licensed to carry less than 100 passengers one operator should hold the commercial first-grade licence and the other may hold a second-grade licence. Vessels of this class carrying or licensed to carry 100 or more passengers and under the London Convention vessels having constant service should have at least two operators, each holding commercial first-grade licences.

Class B.—Cargo steamers which have crews of 50 or more are required to carry two operators, one holding a second-grade commercial licence or higher; the second may be a member of the crew holding a cargo or amateur first-grade operator's licence, requiring a transmitting and receiving ability of at least five words per minute. Vessels of this class maintain a constant receiving watch, but the transmitting service may be during limited hours as required by the vessel.

Class C.—Vessels of this class are those voluntarily equipped with radio apparatus and not subject to the Act quoted herein. The vessels have no fixed hours of service, but should be provided with at least one operator holding a commercial first or second-grade licence.

The following-named vessels come in this class:—

(1) Passenger steamers where the licensed capacity and number of crew combined number less than 50.
(2) Cargo steamers with crews less than 50.
(3) Tugs and towing steamers, etc., with crews less than 50.
(4) Motor vessels.
(5) Sailing vessels and barges.
(6) Yachts.
(7) Steamers of any kind plying between ports or places less than 200 miles apart.

8. An operator's licence may be granted to any person without regard to sex, nationality, or age, if the applicant can fulfil the requirements for the class of licence desired. Although no stated experience is required, the examinations for the different grades are such as requires a proper amount of experience to pass.

9. *Temporary permits.*—Section 3 of the Act of August 13th, 1912, provides:—

In case of emergency, the Secretary of Commerce may authorise a

collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the Radio Ship Act of June 24th, 1910.

The permits should be issued only to persons who the collector of customs has reason to believe are skilled in the use of the apparatus, but have not had the opportunity to present themselves for examination before Government officers authorised to conduct examinations and furnish licences. The temporary permit is valid for one trip only. The collector of customs will forward to the Department of Commerce (Bureau of Navigation) a report covering each temporary permit issued and the reasons for its issue.

3. *Apparatus.*

1. When the radio apparatus is certified as complying with the requirements of law by the competent authorities of a foreign Government, such certificate will be recognised by this Department, but the radio inspector or customs officer may, if he deem it necessary or desirable, satisfy himself that the apparatus is in good working order.

2. Whenever practicable, the radio inspector shall satisfy himself on his visit before the departure of a steamer subject to the Act that the apparatus is efficient and in good working order within the meaning of the Act, and, if satisfied, he shall issue a certificate in the form in Appendix A (p. xxx.). The duplicate of these certificates should be filed with the collector of customs as a record of the radio-equipment of vessels sailing from his port.

3. When inspection of the apparatus by a radio inspector or customs officer is not practicable, the master of the steamer may furnish to the visiting customs officer a certificate in the form of Appendix B (p. xxx.). Such certificate shall be retained in the files of the collector of customs.

Whenever the radio inspector is absent from his home port, he will notify the collector of customs, who will arrange for the collection of certificates and survey of equipment.

4. The current necessary to transmit and receive messages shall at all times while the steamer is under way be available for the radio operator's use.

5. An auxiliary power supply, independent of the vessel's main electric power plant, must be provided which will enable messages to be sent for at least four hours over a distance of at least 100 miles, day or night.

Storage battery sets of sufficient voltage and capacity to operate the regular motor generator or source of primary alternating current are recommended. A complete separate auxiliary set comprising power source and wireless equipment may be provided if the required results are obtained.

Any auxiliary engine for wireless purposes must operate on a fuel which will fulfil the requirements of Rule XI., section 5, of the General Rules and Regulations of the Steamboat-Inspection Service, reading as follows:—

> None of the inflammable articles specified in section 4472, Revised Statutes, or oil that will not stand a fire test of 300° F. shall be used as stores on any pleasure steamer or steamer carrying passengers except that vessels not carrying passengers for hire may transport gasoline or any of the products of petroleum for use as a source of motive power for motor boats or launches of such vessels. (Sec. 4472, R.S.)

6. Efficient communication between the radio room and the bridge must be maintained. A speaking tube or telephone will comply with this requirement. A bell and messenger service will not be acceptable unless there are special conditions justifying this equipment. The speaking tube or telephone must terminate in the radio room and on the bridge, or in the chart room if readily accessible from the bridge. If the radio room is adjacent to or accessible from the bridge so that orders may be transferred direct, no means of communication will be required. Any arrangement calling for the services of a third person to transmit the message will not be satisfactory. The radio inspectors will notify the ship authorities whether the means of communication provided is satisfactory at the time of inspection.

7. One extra pair of head telephones, extra cords, and extra detectors should always be kept on hand.

8. A storage battery voltmeter, hydrometer, a supply of electrolyte, and distilled water should be a part of the regular equipment, but are not prescribed in terms by statute. The absence of these and similar inexpensive emergency articles will be brought to the attention of the master and of the company installing the apparatus by the radio inspector, in writing, and if after a reasonable interval they have not been supplied, the inspector will communicate the fact to the Commissioner of Navigation.

4. *Constant Watch.*

On vessels of the United States it is the statutory duty of the master to see that one operator is on duty at all times. The radio service of the ship is under the supreme authority of the master.

5. *Miscellaneous.*

1. The amended Act applies to vessels licensed to carry as well as those actually carrying 50 or more persons, etc.

2. Distances under the Act are to be computed in nautical miles.

6. *Additions or Amendments.*

Additional or amendatory regulations will be issued from time to time as they may appear necessary.

APPENDIX A.—*Radio Service Form 752.*

Certificate of Radio Inspection.

PORT OF ——— ———,

——— ———, 191—.

This is to certify that I have to-day examined the apparatus for radio communication on the S.S. ———, of which ——— ——— is master, about to leave this port for ———, and I have found the same efficient and in good working order, as prescribed by the Act of June 24, 1910, as amended by the Act of July 23, 1912.

(Signed) ——— ———,

Radio Inspector.

(Or) ——— ———,

Customs Inspector.

APPENDIX B.—*Radio Service Form 753.*

Master's Certificate of Radio Apparatus.

NOTICE.

The radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated. Such equipment, operators, the regulation of their watches, and the transmission and receipt of messages, except as may be regulated by law or international agreement, shall be under the control of the master, in the case of a vessel of the United States; and every wilful failure on the part of the master to enforce at sea the provisions of this paragraph as to equipment, operators, and watches shall subject him to a penalty of $100. (Act of July 23, 1912.)

PORT OF ——— ———,

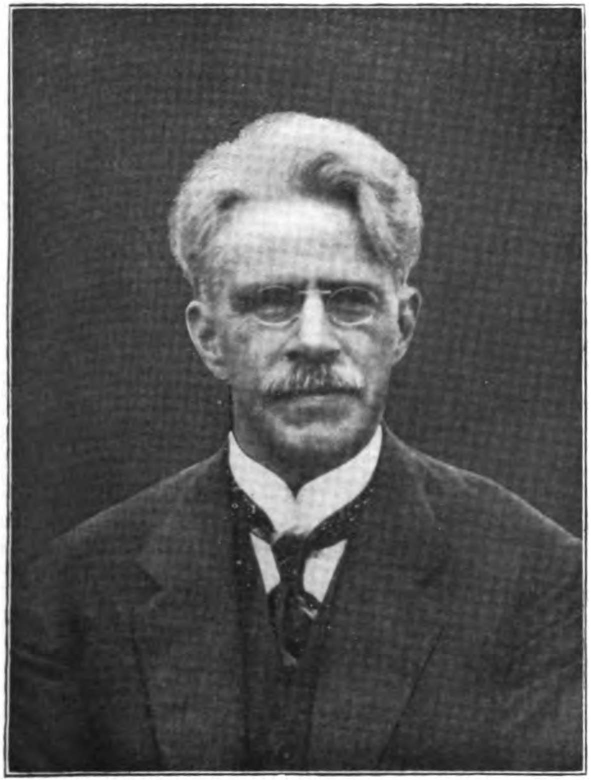
——— ———, 191—.

This is to certify that I have to-day examined the apparatus for radio communication on the S.S. ———, of which I am master, about to leave this port for ———, and I have found the same efficient and in good working order, as prescribed by the Act of June 24, 1910, as amended by the Act of July 23, 1912.

(Signed) ——— ———, *Master.*

An Act to regulate radio-communication, approved August 13th, 1912:—

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a person, company, or corporation within the jurisdiction of the United States shall not use or operate any apparatus for radio communication as a means of commercial intercourse among the several States, or with foreign nations, or upon any vessel of the United States engaged in interstate or foreign commerce, or for the transmission of radiograms or signals



Dr. Barbosa Goncalves
Minister of Public Works, Brazil.

[*To face page* 256

the effect of which extends beyond the jurisdiction of the State or Territory in which the same are made, or where interference would be caused thereby with the receipt of messages or signals from beyond the jurisdiction of the said State or Territory, except under and in accordance with a licence, revocable for cause, in that behalf granted by the Secretary of Commerce and Labour upon application therefor; but nothing in this Act shall be construed to apply to the transmission and exchange of radiograms or signals between points situated in the same State: *Provided*, That the effect thereof shall not extend beyond the jurisdiction of the said State or interfere with the reception of radiograms or signals from beyond said jurisdiction; and a licence shall not be required for the transmission or exchange of radiograms or signals by or on behalf of the Government of the United States, but every Government station on land or sea shall have special call letters designated and published in the list of radio stations of the United States by the Department of Commerce and Labour. Any person, company, or corporation that shall use or operate any apparatus for radio communication in violation of this section, or knowingly aid or abet another person, company, or corporation in so doing, shall be deemed guilty of a misdemeanour, and on conviction thereof shall be punished by a fine not exceeding $500, and the apparatus or device so unlawfully used and operated may be adjudged forfeited to the United States.

Sec. 2. That every such licence shall be in such form as the Secretary of Commerce and Labour shall determine, and shall contain the restrictions, pursuant to this Act, on and subject to which the licence is granted; that every such licence shall be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico, and shall specify the ownership and location of the station in which said apparatus shall be used and other particulars for its identification and to enable its range to be estimated; shall state the purpose of the station, and, in case of a station in actual operation at the date of passage of this Act, shall contain the statement that satisfactory proof has been furnished that it was actually operating on the above-mentioned date; shall state the wave length or the wave lengths authorised for use by the station for the prevention of interference and the hours for which the station is licensed for work; and shall not be construed to authorise the use of any apparatus for radio communication in any other station that that specified. Every such licence shall be subject to the regulations contained herein, and such regulations as may be established from time to time by authority of this Act or subsequent Acts and treaties of the United States. Every such licence shall provide that the President of the United States in time of war or public peril or disaster may cause the closing of any

station for radio communication and the removal therefrom of all radio apparatus, or may authorise the use or control of any such station or apparatus, by any department of the Government, upon just compensation to the owners.

Sec. 3. That every such apparatus shall at all times, while in use and operation as aforesaid be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce and Labour. Every person so licensed who in the operation of any radio apparatus shall fail to observe and obey regulations contained in or made pursuant to this Act or subsequent Acts or treaties of the United States or any one of them, or who fail to enforce obedience thereto by an unlicensed person while serving under his supervision, in addition to the punishment and penalties herein prescribed, may suffer the suspension of the said licence for a period to be fixed by the Secretary of Commerce and Labour not exceeding one year. It shall be unlawful to employ any unlicensed person or for any unlicensed person to serve in charge or in supervision of the use and operation of such apparatus, and any person violating this provision shall be guilty of a misdemeanour, and on conviction thereof shall be punished by a fine of not more than $100 or imprisonment for not more than two months or both, in the discretion of the court, for each and every such offence: *Provided,* That in case of emergency the Secretary of Commerce and Labour may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the radio ship Act of June 24, 1910.

Sec. 4. That for the purpose of preventing or minimising interference with communication between stations in which such apparatus is operated, to facilitate radio communication, and to further the prompt receipt of distress signals, said private and commercial stations shall be subject to the regulations of this section. These regulations shall be enforced by the Secretary of Commerce and Labour through the collectors of customs and other officers of the Government as other regulations herein provide for.

The Secretary of Commerce and Labour may, in his discretion, waive the provisions of any or all of these regulations when no interference of the character above mentioned can ensue.

The Secretary of Commerce and Labour may grant special temporary licences to stations actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will ensure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations.

In these regulations the naval and military stations shall be understood to be stations on land.

REGULATIONS.

1. *Normal Wave Length.*—Every station shall be required to designate a certain definite wave length as the normal sending and receiving wave length of the station. This wave length shall not exceed 600 metres or it shall exceed 1,600 metres. Every coastal station open to general public service shall at all times be ready to receive messages of such wave lengths as are required by the Berlin convention. Every ship station, except as hereinafter provided, and every coast station open to general public service shall be prepared to use two sending wave lengths, one of 300 metres and one of 600 metres, as required by the international convention in force: *Provided,* That the Secretary of Commerce and Labour may, in his discretion, change the limit of wave length reservation made by regulations 1 and 2 to accord with any international agreement to which the United States is a party.

2. *Other Wave Lengths.*—In addition to the normal sending wave length all stations, except as provided hereinafter in these regulations, may use other sending wave lengths: *Provided,* That they do not exceed 600 metres or that they do exceed 1,600 metres: *Provided further,* That the character of the waves emitted conforms to the requirements of regulations 3 and 4 following.

3. *Use of a "Pure Wave."*—At all stations if the sending apparatus, to be referred to hereinafter as the "transmitter," is of such a character that the energy is radiated in two or more wave lengths, more or less sharply defined, as indicated by a sensitive wave meter, the energy in no one of the lesser waves shall exceed 10 per cent. of that in the greatest.

4. *Use of a "Sharp Wave."*—At all stations the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto.

5. *Use of "Standard Distress Wave."*—Every station on shipboard shall be prepared to send distress calls on the normal wave length designated by the international convention in force, except on vessels of small tonnage unable to have plants insuring that wave length.

6. *Signal of Distress.*—The distress call used shall be the international signal of distress:— . . . — — — . . .

7. *Use of Broad "Interfering Wave" for Distress Signals.*—When sending distress signals, the transmitter of a station on shipboard may be tuned in such a manner as to create a maximum of interference with a maximum of radiation.

8. *Distance Required for Distress Signals.*—Every station on

shipboard, wherever practicable, shall be prepared to send distress signals of the character specified in regulations 5 and 6, with sufficient power to enable them to be received by day over sea a distance of 100 nautical miles by a shipboard station equipped with apparatus for both sending and receiving equal in all essential particulars to that of the station first mentioned.

9. *"Right of Way" for Distress Signals.*—All stations are required to give absolute priority to signals and radiograms relating to ships in distress; to cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, to refrain from sending until all signals and radiograms relating thereto are complete.

10. *Reduced Power for Ships near a Government Station.*—No station on shipboard, when within fifteen nautical miles of a naval or military station, shall use a transformer input exceeding one kilowatt, nor, when within five nautical miles of such a station, a transformer input exceeding one-half kilowatt, except for sending signals of distress, or signals or radiograms relating thereto.

11. *Intercommunication.*—Each shore station to general public service between the coast and vessels at sea shall be bound to exchange radiograms with any similar shore station and with any ship station without distinction of the radio systems adopted by such stations, respectively, and each station on shipboard shall be bound to exchange radiograms with any other station on shipboard without distinction of the radio systems adopted by each station, respectively.

It shall be the duty of each such shore station, during the hours it is in operation, to listen in at intervals of not less than fifteen minutes and for a period of not less than two minutes, with the receiver tuned to receive messages of 300 metre wave lengths.

12. *Division of Time.*—At important seaports and at all other places where naval or military and private or commercial shore stations operate in such close proximity that interference with the work of naval and military stations cannot be avoided by the enforcement of the regulations contained in the foregoing regulations concerning wave lengths and character of signals emitted, such private or commercial shore stations as do interfere with the reception of signals by the naval and military stations concerned shall not use their transmitters during the first fifteen minutes of each hour, local standard time. The Secretary of Commerce and Labour may, on the recommendation of the department concerned, designate the station or stations which may be required to observe this division of time.

13. *Government Stations to Observe Division of Time.*—The naval or military stations for which the above-mentioned division

of time may be established shall transmit signals or radiograms only during the first fifteen minutes of each hour, local standard time, except in case of signals or radiograms relating to vessels in distress, as hereinbefore provided.

14. *Use of Unnecessary Power.*—In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired.

15. *General Restrictions on Private Stations.*—No private or commercial station not engaged in the transaction of *bona fide* commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wave length exceeding 200 metres, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce and Labour contained in the licence of the station: *Provided,* That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third or fourth regulations to the penalties of $100 or $25, respectively, provided in this section unless the person maintaining or operating such station shall have been notified in writing that the said transmitter had been found, upon tests conducted by the Government, to be so adjusted as to violate the said third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

16. *Special Restrictions in the Vicinities of Government Stations.*—No station of the character mentioned in regulation 15 situated within five nautical miles of a naval or military station shall use a transmitting wave length exceeding 200 metres or a transformer input exceeding one-half kilowatt.

17. *Ship Stations to Communicate with Nearest Shore Stations.*—In general, the shipboard stations shall transmit their radiograms to the nearest shore station. A sender on board a vessel shall, however, have the right to designate the shore station through which he desires to have his radiograms transmitted. If this cannot be done, the wishes of the sender are to be complied with only if the transmission can be effected without interfering with the service of other stations.

18. *Limitations for Future Installations in Vicinities of Government Stations.*—No station on shore not in actual operation at the date of the passage of this Act shall be licensed for the transaction of commercial business by radio communication within fifteen nautical miles of the followng naval or military stations—to wit: Arlington, Virginia, Key West, Florida, San Juan, Porta

Rico, North Head and Tatoosh Island, Washington, San Diego, California; and those established or which may be established in Alaska and in the Canal Zone; and the head of the department having control of such Government stations shall, so far as is consistent with the transaction of governmental business, arrange for the transmission and receipt of commercial radiograms under the provisions of the Berlin convention of 1906 and future international conventions or treaties to which the United States may be a party, at each of the stations above referred to and shall fix the rates therefor, subject to control of such rates by Congress. At such stations and wherever and whenever shore stations open for general public business between the coast and vessels at sea under the provisions of the Berlin convention of 1906 and future international conventions and treaties to which the United States may be a party shall not be so established as to ensure a constant service day and night without interruption, and in all localities wherever and whenever such service shall not be maintained by a commercial shore station within 100 nautical miles of a naval radio station, the Secretary of the Navy shall, so far as is consistent with the transaction of Government business, open naval radio stations to the general public business described above, and shall fix rates for such service, subject to control of such rates by Congress. The receipts for such radiograms shall be covered into the Treasury as miscellaneous receipts.

19. *Secrecy of Messages.*—No person or persons engaged in or having knowledge of the operation of any station or stations shall divulge or publish the contents of any messages transmitted or received by such station, except to the person or persons to whom the same may be directed, or their authorised agent, or to another station employed to forward such message to its destination, unless legally required so to do by the court of competent jurisdiction or other competent authority. Any person guilty of divulging or publishing any message, except as herein provided, shall, on conviction thereof, be punishable by a fine of not more than $250 or imprisonment for a period of not exceeding three months, or both fine and imprisonment, in the discretion of the court.

20. *Penalties.*—For violation of any of these regulations, subject to which a licence under sections 1 and 2 of this Act may be issued, the owner of the apparatus shall be liable to a penalty of $100, which may be reduced or remitted by the Secretary of Commerce and Labour, and for repeated violations of any such regulations the licence may be revoked.

For violation of any of these regulations, except as provided in regulation 19, subject to which a licence under section 3 of this

Act may be issued, the operator shall be subject to a penalty of $25, which may be reduced or remitted by the Secretary of Commerce and Labour, and for repeated violations of any such regulations the licence shall be suspended or revoked.

Sec. 5. That every licence granted under the provisions of this Act for the operation or use of apparatus for radio communication shall prescribe that the operator thereof shall not wilfully or maliciously interfere with any other radio communication. Such interference shall be deemed a misdemeanour, and upon conviction thereof the owner or operator, or both, shall be punishable by a fine of not to exceed $500 or imprisonment for not to exceed one year, or both.

Sec. 6. That the expression "radio communication" as used in this Act means any system of electrical communication by telegraphy or telephony without the aid of any wire connecting the points from and at which the radiograms, signals, or other communications are sent or received.

Sec. 7. That a person, company, or corporation within the jurisdiction of the United States shall not knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent distress signal or call or false or fraudulent signal, call, or other radiogram of any kind. The penalty for so uttering or transmitting a false or fraudulent distress signal or call shall be a fine of not more than $2,500 or imprisonment for not more than five years, or both, in the discretion of the court, for each and every such offence, and the penalty for so uttering or transmitting, or causing to be uttered or transmitted, any other false or fraudulent signal, call, or other radiogram shall be a fine of not more than $1,000 or imprisonment for not more than two years, or both, in the discretion of the court, for each and every such offence.

Sec. 8. That a person, company, or corporation shall not use or operate any apparatus for radio communication on a foreign ship in territorial waters of the United States otherwise than in accordance with the provisions of sections 4 and 7 of this Act and so much of section 5 as imposes a penalty for interference. Save as aforesaid, nothing in this Act shall apply to apparatus for radio communication on any foreign ship.

Sec. 9. That the trial of any offence under this Act shall be in the district in which it is committed, or if the offence is committed upon the high seas or out of the jurisdiction of any particular State or district, the trial shall be in the district where the offender may be found or into which he shall be first brought.

Sec. 10. That this Act shall not apply to the Philippine Islands.

Sec. 11. That this Act shall take effect and be in force on and after four months from its passage.

The United States Court, at Norfolk (Virginia), decided

recently that vessels entering American ports for bunker coal only are not subject to the provisions of the U.S. Wireless Telegraph Act, making it compulsory for certain classes of vessels to carry wireless telegraph outfits.

THE following Regulations were issued on July 1st, 1913:—

Part 1. Licences—Apparatus.

A. Apparatus Exempt from Licence.

The Act does not apply either afloat or ashore to—

(*a*) Apparatus for radio communication which merely receives radiograms and is not equipped for sending.

(*b*) Apparatus for the transmission of radiograms exclusively between points in the same State, if the effect of such transmission does not extend beyond the State (so as to interfere with the radio communication of other States), or if the effect of such transmission does not interfere with the reception of radiograms from beyond the State (so as to interfere with the interstate radio communication of that State).

(*c*) Apparatus for radio communication which has been issued to the Organised Militia by the War Department or to the Naval Militia by the Navy Department, and is used for official purposes only.

The owner or operator of any apparatus who may be in doubt whether his apparatus, under this paragraph, is exempt from licence may write the facts to the radio inspector for his district or to the Commissioner of Navigation, Deparment of Commerce, Washington, D. C., before applying for a licence.

B. Ship Stations.

The apparatus for transmission of radiograms, or signals on any vessel of the United States not permanently moored, requires a licence.

For the purposes of the administration of the Act, ship stations on vessels of the United States shall be of these classes:

Class A.—Ocean and Great Lakes passenger steamers subject to the Act of July 23rd, 1912, and required to carry two operators and maintain a constant skilled watch.

Class B.—Cargo steamers with crews of 50 or more, required to carry two operators, the second of whom may be a member of the crew certified as competent to receive distress calls, etc., maintaining a transmitting service during limited hours but a constant receiving watch.

Class C.—Vessels voluntarily equipped with radio apparatus and not subject to the Act of June 24th, 1910, as amended July 23rd, 1912 with no fixed hours of service, such as—

1. Passenger steamers, where the licensed capacity and number of crew combined are less than 50.

2. Cargo steamers with crews less than 50.
3. Tugs and towing steamers, etc., with crews less than 50.
4. Motor vessels.
5. Sailing vessels and barges.
6. Yachts.
7. Steamers of any kind plying between ports or places less than 200 miles apart.

C. Land Stations.

Apparatus for radio communication on land within the jurisdiction of the United States (excluding the Philippine Islands and excluding apparatus of the Government of the United States) must be licensed if—

(*a*) The apparatus is a means of commercial intercourse among the several States or with foreign nations; or

(*b*) The apparatus transmits radiograms or signals the effect of which at any time extends beyond the State; or

(*c*) The apparatus interferes with the receipt of messages in any State from beyond such State.

For the purposes of the administration of the Act, stations on land are divided into two general dsecriptions, according to geographical location:

I. Coast or Shore Stations are stations which transmit messages to vessels at sea or on the Great Lakes or whose operations can affect the transmission of messages between ship and ship, or ship and coast. Vessels of the United States permanently moored are classed as coast stations under the International Convention.

II. Inland Stations are stations which cannot transmit messages to vessels at sea or on the Great Lakes and whose operations can not affect the transmission of messages between ship and ship, or ship and coast. This may be due to their geographical location or to their range, dependent on power and aerial, or conditions. In some instances actual inspection may be necessary to determine whether a station should be licensed as a coast station or an inland station.

An operator or owner in doubt as to the classification of his station should communicate the facts to the radio inspector of his district when applying for a licence.

As the means for enforcing the radio laws are limited, it is necessary to give ship and commercial stations precedence over amateur stations. The owner of an amateur station may operate his station in accordance with the laws if his application for a licence has been properly filed but has not been acted upon. An application for an operator's licence must also have been filed and every effort made to obtain the licence before the station may be operated.

"Provisional" station licences are issued to amateurs remote from the headquarters of the radio inspector of the district in which the

station is located. These licences are issued as a matter of convenience and record. If, upon inspection, the station is found to comply with the law, the inspector will strike out the word "Provisional" and insert the date of inspection and his signature at the bottom of the licence.

If such a station is found not to comply with the law, the provisional licence may be cancelled until such time as the apparatus is readjusted to meet the requirements of the law: *Provided, however,* that consideration will be given to any reports of interference filed against such a station.

Classes of Land Stations.

Both coast stations (the words "coast stations," "shore stations," and "coastal stations" are used interchangeably) and inland stations are divided for the purposes of the administration of the Act into the following classes:—

1. Public-service stations, (*a*) general, (*b*) limited.
2. Limited commercial stations.
3. Experiment stations for the development of radio communication.
4. Technical and training school stations.
5. General amateur stations.
6. Special amateur stations.
7. Restricted amateur stations.

Description of Classes.

1. (*a*) *Public-service stations, general,* are those open to general business between coast and ships or between land stations, and include those operated by common carriers under the Act of February 4th, 1887, to regulate commerce, amended June 18th, 1910. They are required to maintain a constant receiving service when open. Every coastal station open to public service shall at all times be ready to receive messages of such wave lengths as are required by the International Convention in force. (Sec. 4, first regulation, Act of August 13th, 1912.)

Whenever such stations do not insure a constant service, transmitting and receiving day and night without interruption, the Secretary of the Navy is directed to open naval radio stations within 100 miles thereof to public business. (Sec. 4, 18th regulation, Act of August 13th, 1912.) The Secretary of War is authorised by the Act of May 26th, 1900 (31 Stat., 206), to open Alaskan military stations to public service.

1. (*b*) *Public-service stations, limited,* are reserved for a limited public service, determined by the object of the correspondence or other circumstances independent of the system employed. Stations of this class transmit and receive public messages to and from certain stations only, which are designated in the licence.

2. *Limited commercial stations* are not open to public service and are licensed for a specific commercial service or services defined in the licence. Stations of this class must not transmit to or accept public messages from other stations.

3. *Experiment stations.*—The Secretary of Commerce is authorised by section 4 of the Act to grant special temporary licences "to stations actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations." Applicants for such licences should state any technical result they have already produced, their technical attainments, etc. The fact that an applicant desires to experiment with his equipment does not justify or require a licence of this class. Most experiments can be made within the limitations of general and restricted amateur station licences or by use of an artificial antenna to prevent radiation.

4. *Technical and training school stations* will be licensed in a separate class, according to the degree of technical training attained and imparted and to local conditions.

5. *General amateur stations* are restricted to a transmitting wave length not exceeding 200 metres and a transformer input not exceeding 1 kilowatt. (Sec. 4, 15th regulation, Act of August 13th, 1912.)

6. *Special amateur stations* may be licensed by the Secretary of Commerce to use a longer wave length and a higher power on special application to the Secretary of Commerce. Applications for this class from amateurs with less than two years' experience in actual radio communication will not be approved. The application must state the experience and purpose of the applicant, the local conditions of radio communication, especially of maritime radio communication in the vicinity of the station, and a special licence will be granted only if some substantial benefit to the art or to commerce apart from individual amusement seems probable. (Sec. 4, 15th regulation, Act of August 13th, 1912.)

7. *Restricted amateur stations,* within 5 nautical miles of a naval or military station, are restricted to a wave length not exceeding 200 metres and to a transformer input not exceeding one-half kilowatt. (Sec. 4, 16th regulation, Act of August 13th, 1912.)

Special stations for exceptional distances are land stations designed (coast) to carry on transoceanic radio communication as between the United States and European countries, or between the Pacific coast and Hawaii, or from the United States over similar long distances at sea to another land station, or (inland) to carry on radio

communication overland over exceptional distances. These stations will all come under one of the classifications named above, and the licence will indicate the stations for which communication is authorised and indicate the range.

General public service, limited public service, limited commercial, special amateur, and special stations which come under the classification of coast stations are subject to the same requirements as to the provision for receiving and relaying distress calls.

Stations operated at different portions of the day for different purposes will require licences covering each purpose; that is, a station used during the day for limited commercial purposes and during the night for general public service will require two licences.

Part 2. Licences—Operators.

The third section of the Act prescribes that every radio apparatus required to be licensed shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce.

Licences approved and issued by the Secretary of Commerce to operators will be delivered to applicants after passing examinations given by the officers named under the head "Examination of operators for licences."

[Note.—*Apprentices.*—Under the supervision of a licensed operator an apprentice or unlicensed person may learn the art by the actual use of the apparatus, but the licensed operator who fails to enforce obedience to the regulations by the apprentice or unlicensed person serving under his supervision is liable to penalties as if he had himself violated the regulations.]

Operators' licences are divided into the following grades:—

I. Commercial:

1. First grade.
2. Second grade.
3. Cargo grade.
4. Extra grade.
5. Temporary permit.

II. Amateur:

6. First grade.
7. Second grade.

III. Technical:

8. Experiment and instruction grade.

The requirements which applicants must meet to secure licences of the several grades and the scope and limitations of employment authorised by the licences of the several grades are as follows:—

I. Commercial.

First grade.—The applicant must pass a satisfactory examination in—

(*a*) The adjustment, operation, and care of the apparatus, including correction of faults and change from one wave length to another.

(*b*) Transmitting and receiving by ear at a speed of not less than 20 words a minute in Continental Morse (five letters to the word).

(*c*) Use and care of storage battery or other auxiliary power apparatus.

(*d*) Knowledge of the international regulations in force applying to radio communication.

(*e*) Knowledge of the requirements of the Acts of Congress to regulate radio communication—sections 3, 4, 5, 6, and 7 of the Act of August 13th, 1912. No stated experience is required, but the examination given is such that a person must be familiar with all parts and principles embodied in a ratio set and auxiliary power apparatus used, to obtain a licence.

(1) The commercial first-grade licence qualifies the operator for employment at any ship or land station of any class and is the highest certificate indicative of ability as radio operator issued at this time.

(2) Every ship station of class A must carry two or more operators, at least one of whom must have a valid commerical first-grade licence, or, in the case of a foreign ship, have an equivalent foreign licence.

[Note.—The requirements for this grade are the same as the international requirements imposed on operators of foreign ships by international regulation, except the knowledge of the use and care of storage battery or other auxiliary and of the Act of August 13th, 1912. Inspectors will allow a reasonable time to foreign operators on foreign ships to meet the additional requirements, supplying them as promptly as practicable with copies of the Act of August 13th, 1912.]

(3) Every ship station of class A on a steamer carrying 100 or more passengers, and under the London Convention vessels having constant service, must carry at least two operators having commercial first-grade licences.

(4) Every land station open to general public service must have at least one commercial first-grade operator.

(5) Every coast station of class 1 must have commercial first-grade operators.

Second grade.—The applicant must pass a satisfactory examination in all the subjects prescribed above for the first grade, with the exception that the minimum speed in transmitting and receiving shall

not be less than 12 words a minute in Continental Morse, and the examination in the subjects will not be as comprehensive as that given first-grade operators.

(1) An operator licensed as commercial second-grade, on subsequent compliance with the speed test for the first-grade, and further examination on the subjects named, may have his licence raised to the first grade by the indorsement in red ink on the face of his licence "Examined on [date] at [place] and passed first grade by [examining officer's signature]," or a first-grade licence may be issued.

(2) Every ship station under class A (except steamers carrying 100 or more passengers) must carry a second operator, having the commercial second-grade licence, or higher.

(3) Every ship station under classes B and C must carry at least one operator licensed as commercial second grade, or higher.

(4) Every coast station of classes 2 and 6 must have at least one operator holding a valid commercial second-grade licence.

Cargo grade.—Section 2 of the Act of July 23rd, 1912, provides:

> On cargo steamers, in lieu of the second operator provided for in this Act, there may be substituted a member of the crew or other person who shall be duly certified and entered in the ship's log as competent to receive and understand distress calls or other usual calls indicating danger, and to aid in maintaining a constant wireless watch so far as required for the safety of life.

The examination will be conducted so as to determine the following facts:

(1) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the distress signal (SOS), when included in a list of other words or signals sent slowly. (Approximately five words a minute.)

(2) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the radio call letters of the vessel on which he desires to operate when sent slowly and repeated several times.

(3) That the applicant is sufficiently familiar with the type of the receiving apparatus of the vessel on which he desires to operate to determine by a buzzer or similar test that the detector or receiving apparatus is properly adjusted to receive signals.

Examining officers and radio inspectors are authorised to issue a certificate, in the form of an amateur first-grade licence, after examination, to indicate the facts above enumerated in the case of a member of the crew or other person, and experience under this form will be credited by examining officers if the holder later applies for examination for a commercial licence. These licences will be marked "Cargo" in the upper right-hand corner under the serial number.

Extra grade.—The Department desires to establish, if practicable, a corps of specially trained and trustworthy radio operators who may be available for Government service. For this purpose a special licence will be issued to operators holding the commercial first-grade licence, whose certificates of skill in radio communication, issued under the Act of June 24th, 1910, and licences under this Act record 12 months' satisfactory ocean service as shown by masters' endorsement. A special examination in the radio regulations of the United States Navy will also be required. The commercial extra-grade licence will be issued during 1913, and will be the subject of a special circular.

Temporary permit.—Section 3 of the Act of August 13th, 1912, provides:

> In case of emergency the Secretary of Commerce may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the radio ship Act of 1910.

The temporary permit is to be issued only in cases of emergency and will be valid for only one voyage. The collector will report in each case to the Commissioner of Navigation the circumstances which rendered necessary the issue of a temporary permit.

Radio operators holding licences of any grade or class and applying for examination for any other grade or class must submit to the examining officer an additional form, No. 756, in duplicate. If a new licence is issued, the licence held by the applicant must be surrendered.

II. Amateur.

General.—Amateurs, before applying for licences, should read and understand the essential parts of the International Radiotelegraphic Convention in force and sections 3, 4, 5, and 7 of the Act of August 13th, 1912. The Department recognises that radio communication offers a wholesome form of instructive recreation for amateurs. At the same time, its use for this purpose must observe strictly the rights of others to the uninterrupted use of apparatus for important public and commercial purposes. The Department will not knowingly issue a licence to an amateur who does not recognise and will not obey this principle.

First grade.—The applicant must have a sufficient knowledge of the adjustment and operation of the apparatus which he wishes to operate, and of the regulations of the International Convention and Acts of Congress in so far as they relate to interference with other radio communication and impose certain duties on all grades of operators. The applicant must be able to transmit and receive in Continental Morse, at a speed sufficient to enable him to recognise

distress calls or the official "keep-out" signals. A speed of at least five words per minute (five letters to the word) must be attained. Applicants for licences of this grade residing at or near any place where examinations are held will communicate with examining officers and will be examined for licences of amateur grades. At places remote from examining officers, applicants will file applications with the radio inspector, who will endeavour to arrange for examinations on his inspection trips.

Second grade.—The requirements for the second grade will be the same as for the first grade. The second-grade licence will be issued only where an applicant cannot be examined or until he can be examined. An examining officer or radio inspector is authorised in his discretion to waive an actual examination of an applicant for an amateur licence, if the amateur for adequate reasons cannot present himself for examination, but in writing can satisfy the examining officer or radio inspector that he is qualified to hold a licence and will conform to its obligations.

III. Technical.

Experiment and instruction grade.—The operator's licence for this grade is a commercial licence, endorsed by the Secretary of Commerce, with a statement of the special purposes for which it is valid. It should be forwarded to the Commissioner of Navigation with a recommendation, if practicable, from a radio inspector or examining officer.

Experimenters and instructors of scientific attainments in the art of radio communication, whose knowledge of the radio laws satisfies the radio inspector or the examining officer, may obtain this grade licence, provided they are able to transmit and receive in the Continental Morse Code at a speed sufficient to enable them to recognise distress calls or the "keep-out" signals.

This licence has no reference to the instruction of radio operators as such, but is required by those operating apparatus licensed as experimental stations, but who are unable to obtain commercial-grade operators' licences.

Part 3. Applications for Licences.

Station licences for the use and operation of apparatus for radio communication under the Act may be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico.

Licences can be issued to clubs if they are incorporated or if a member will accept the responsibility for the operation of the apparatus,

Senor Fernando Gil

(Director-General of Federal Telegraphs, Mexico).

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carrying with it the possibility of being penalised for infraction of the laws.

I. Ship Stations.

Applications for licences for ship stations should be addressed to the radio inspector for the district, including the port whence the vessel usually departs.

The application by the company operating the apparatus should state the name of the ship in respect of which the licence is required. The radio inspector will then issue the Department's blank form of application for licence to be filled in by the applicant and returned to the radio inspector with a statement when the ship will be in port and its radio apparatus may be thoroughly inspected.

II. Land Stations.

Coast stations.—The several classes of coast stations will be licensed, for reasons already assigned, in advance of inland stations.

Applications for licences for coast stations should be addressed to the Department's radio inspector for the district in which the station is located, who will forward the application Form 757.

All land stations, except general and restricted amateur stations, should state their location in latitude and longitude to seconds.

The application will state the class of the station for which a licence is desired, with particulars to show its proper classification, approximate transmitting range with a similar station, and precise location (State, county, city, or town, street and number, or, if outside of city or town limits, as exact a description of its locality as may be). A blank form for apparatus will be sent when Form 757 has been filed, and arrangements made for inspection if necessary. Requests for licences for coast stations will be taken up in the order of classes, as indicated above, and in the order of date received only so far as the relative importance of stations will permit. Amateur applicants who state that they have read the International Radiotelegraphic Convention in force and the Act of August 13, 1912, will receive attention before those who have not.

Inland stations.—The issue of licences to inland stations, as already defined, will be taken up after ship and coast stations. The procedure for application for licence will be the same as for coast stations.

III. Forms.

(*a*) The several forms of applications and licences for operators will be issued through examining officers (through the War and Navy Departments) and radio inspectors. The licences will be numbered serially.

(*b*) The forms and licences for stations and apparatus will be issued through radio inspectors. Licences for general and restricted amateur stations are issued by them direct to applicant. Station licences of all other classes are issued from the office of the Commissioner of Navigation, Department of Commerce.

IV. Commercial Operators.

Applications for operators' licences of the several commercial grades should be addressed to the nearest examining officer or radio inspector, who will arrange for examinations. Where the applicant is not within reasonable distance of an examining officer or radio inspector he may forward his application with a statement of the facts.

Commercial licences can only be obtained by examination. Where applicants are at remote points or can not proceed to examining offices efforts will be made to examine them through radio inspectors when they are in that vicinity, but special trips cannot be made for that purpose.

V. Amateur Operators.

(*a*) Amateurs in the seaboard States should write to the nearest examining officer in their vicinity for Form 756 (application for operator's licence) and to the radio inspector in their vicinity for Form 757 (application for licence for land station). If the application for operator's licence is also made to the radio inspector, both applications should be forwarded in the same envelope.

(*b*) Amateur operators at points remote from examining officers and radio inspectors will be issued second-grade amateur licences without examination, as explained previously. Examinations for first-grade licences will be given by the radio inspector when he is in that vicinity, but special trips can not be made for this purpose.

Part 4. General Observations.

1. An operator's licence may be granted to any person without regard to sex, nationality, or age if the applicant can fulfil the requirements for the class of licence desired.

2. No stated experience is required. The examinations for the different grades are such as require a proper amount of experience to pass.

3. The service regulations of the radiotelegraphic convention in force provides that "no station on shipboard shall be established or worked by private enterprise without authority from the Government to which the vessel is subject." Such authority shall be in the nature of a licence issued by said Government. Stations on foreign ships will be licensed by their Governments, respectively. Inspectors will report to the Commissioner of Navigation stations on foreign ships not so licensed.

4. The lists of call signals when issued by the Department of Commerce may be obtained from the radio inspectors or the Commissioner of Navigation and will show the location of naval and military stations.

5. Operator's licences should be framed and posted in the radio room, and licences for stations should be accessible at all times to inspectors.

6. Operator's licences should indicate on their face that the oath has been executed. This statement should be signed by a notary public.

7. Stations equipped to receive only do not require a licence.

8. No fees are charged for any operator or station licence.

9. Licensed stations require licensed operators.

10. Amateur stations within five miles of naval or military stations need not have been in actual operation on or before August 13th, 1912, to obtain a licence for a restricted amateur station.

11. Any person applying for a duplicate licence to replace an original which has been lost, mutilated, or destroyed, will be required to submit an affidavit to the Bureau of Navigation through the radio inspector or examining officer issuing the original, attesting the facts regarding the manner in which the original was lost, mutilated, or destroyed.

The Commissioner of Navigation will consider the facts in the case and advise the radio inspector or examining officer in regard to the issue of a duplicate licence. A duplicate licence will be issued under the same serial number as the original and marked "Duplicate" in red across the face.

12. These instructions may be amended and supplemented from time to time.

THE Minister of Marine of the United States of America has notified to the Berne Bureau that the following information is to be published:—

1. The Departments of the United States Government which are concerned with wireless telegraphy regret that they have not yet been able to make arrangements with the land telegraph of the United States owing to the fact that these are in the hands of commercial companies, and have nothing to do with the Government. The idea was to arrange for the free transmission over the land telegraph, in accordance with Article 14, paragraph 2, of the Rules of Service of the London Convention. The information to be transmitted free of charge was all such as related to the date and the hour of the handing in of radiotelegrams on board ship. But the transmission of such information over land lines being subject to a tax, the Government of the United States cannot, at present, conform strictly to this rule of the Convention. The declaration of the American delegation contained in Article 2 of the Final Protocol made provision for such a possible outcome, although its exact nature was not actually set forth.

2. Multiple radiotelegrams, such as are mentioned in Article 38, paragraph 5, of the Rules of Service, will be accepted as multiple messages in all wireless transmission between ship and shore stations, but all the companies operating land telegraph lines in the United States will consider, and will charge for, a multiple wireless message as consisting of so many individual telegrams as the addresses it bears may indicate.

3. The United States is not a member of the International Telegraphic Union, and consequently is not bound to execute the rules laid down in Article 38, paragraph 8, of the London Convention Rules of Service concerning urgent radiotelegrams. The laws of the United States regulating all reciprocal arrangements between the States forbid the use of the privilege, and consequently all telegraph companies will not allow any priority in favour of telegrams for which any additional tax may have been paid.

URUGUAY

IN January, 1912, the Uruguayan Government issued a Decree compelling ships carrying passengers between the harbours of the Republic and those of foreign countries to be fitted with wireless telegraph installations. The carrying out of this Decree is entrusted to the General Inspection of National Services of Wireless Telegraphy :—

1. Commencing from May 1st of the present year (1912) all the ships carrying passengers between the harbours of the Republic and those of foreign countries shall be fitted with radiotelegraph installations.

2. The said installations shall be designed to receive and transmit telegrams up to a distance of not less than one hundred kilometres on the ships of river navigation, and four hundred kilometres on those of the oceanic navigation.

3. The installations shall be permanently kept in good conditions of working, and capable of intercommunicating with the stations of the Republic.

4. The stations shall be in charge of persons well acquainted with the use of radiotelegraph apparatus.

5. The service of the stations shall be entirely in accordance with the provisions of the International Radiotelegraph Convention.

6. The agents of the companies will inform, before expiration of the time fixed, the General Inspector of the National Services of Wireless Telegraphy of the characteristics, system, power, etc., of the radiotelegraph apparatus to be fitted on the ships of their companies.

7. The ships which after expiration of the time fixed by Article 1 have not complied with the provisions of this Decree, shall not be authorised to carry passengers in the harbours of the Republic.

WIRELESS TELEGRAPH STATIONS OF THE WORLD

A. Land Stations

B. Ship Stations

The tables of land and ship stations set out in the following pages should be consulted in conjunction with the map of wireless telegraph stations of the world which is issued with this volume. The stations have been grouped together under the names of the countries in which they are established, and these countries have been arranged in alphabetical order; therefore no difficulty should be experienced in locating any particular station.

The call letter of every station is given. Recently, however, the International Bureau has allotted a revised list of combinations and call letters to signatories of the Convention, and on p. 343 is published the list of call letters which have been reserved for the exclusive use of the respective countries.

We have also added, on pp. 460 to 494, an alphabetical list of call letters for all stations (land and ship).

With the rapidly-increasing number of installations, especially on ships, the information in this section cannot be complete at the time of publication, but every care has been taken to make the list as complete and as accurate as possible.

Stations which are of a private or experimental character have not been included in the lists, except where the information available has been such as to justify their inclusion. Naval and military stations have been dealt with in a like manner.

A. LAND STATIONS.

The following abbreviations are used in the Table of Land Stations below: Column 2 (Geographical Position): E—East Longitude; W—West Longitude; N—North Latitude; S—South Latitude. Column 7 (Nature of Service); PG—General Public Correspondence; PR—Restricted General Public Correspondence; O—Official Correspondence; P—Private Correspondence. Column 8 (Hours of Service): N—Continuous Service; X—No fixed working hours:

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type)	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
AUSTRALIAN COMMONWEALTH	Meridian of Greenwich.							Francs.	Francs.
Adelaide	138° 40′ 00″ E. 34° 50′ 00″ S.	VIA	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 142° 30′ east of Greenwich, 8 a.m. to 12 p.m.	0.60	—
Brisbane	153° 15′ 00″ E. 27° 30′ 00″ S.	VIB	450	Government ..	300, 450, **600**	P G[1]	N	0.60	—
Broome	Western Australia 122° 20′ 00″ E 17° 55′ 00″ S.	VIO	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 115° 52′ east of Greenwich, 7 a.m. to 7 p.m.	0·60	—
Cooktown	Queensland 145° 14′ 00″ E. 15° 20′ 00″ S.	VIC	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 150° east of Greenwich, 7 a.m. to 7 p.m.	0.60	—
Darwin, South Australia	130° 55′ 00″ E. 12° 45′ 00 S.	VID	450	Government ..	300, 450, **600**	P G[1]	N	0.60	—
Esperance, Western Australia	122° 00′ 00″ E. 33° 40′ 00″ S.	VIE	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 115° 52′ east of Greenwich, 7 a.m. to 7 p.m.	0.60	—
Flinders Island	148° 15′ 00″ E. 40° 00′ 00″ S.	VIL	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 150° east of Greenwich, 7 a.m. to 7 p.m.	0.60	—
Geraldton	Western Australia 114° 40′ 00″ E. 28° 42′ 00″ S.	VIN	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 115° 52′ east of Greenwich, 7 a.m. to 7 p.m.	0.60	—
Hobart	Tasmania 147° 15′ 00″ E. 42° 45′ 00″ S.	VIH	450	Government ..	300, 450, **600**	P G[1]	Mean time of the meridian 150° east of Greenwich: June-Jan., 11 a.m. to 11 [illegible]	0·60	—

	37° 50′ 00″ S.						… of Greenwich, 7 a.m. to 7 p.m.		
Perth	Western Australia 115° 50′ 00″ E. 32° 00′ 00″ S.	VIP	450	Government ..	300, 450, 600	P G[1]	N	0.60	—
Port Moresby	New Guinea 147° 20′ 00″ E. 9° 20′ 00″ S.	VIG	450	Government ..	300, 450, 600	P G[1,2]	N	0.60	—
Rockhampton	Queensland 150° 30′ 00″ E. 23° 20′ 00″ S.	VIR	450	Government ..	300, 450, 600	P G[1]	Mean time of the meridian 150° east of Greenwich, 8 a.m. to 12 p.m.	0.60	—
Roebourne	Western Australia 117° 05′ 00″ E. 20° 50′ 00″ S.	VIZ	450	Government ..	300, 450, 600	P G[1]	N	0.60	—
Sydney	151° 10′ 00″ E. 33° 50′ 00″ S.	VIS	450	Government ..	300, 450, 600	P G[1]	Mean time of the meridian 150° east of Greenwich, 8 a.m. to 2 a.m. N	0.60	—
Thursday Island	Queensland, Torres Strait 142° 25′ 00″ E. 10° 30′ 00″ S.	VII	450	Government ..	300, 450, 600	P G[1,2]	N	0.60	—
Townsville	Queensland 146° 45′ 00″ E. 19° 15′ 00″ S.	VIT	450	Government ..	300, 450, 600	P G[1]	N	0.60	—
Wyndham, Western Australia	127° 55′ 00″ E. 15° 25′ 00″ S.	VIW	450	Government ..	300, 450, 600	P G[1]	Mean time of the meridian 115° 52′ east of Greenwich, 7 a.m. to 7 p.m.	0.60	—
AUSTRIA-HUNGARY									
Castelnuovo	Adriatic coast. Mouths of Cattaro 18° 32′ 04″ E. 42° 27′ 00″ N.	OHC	By day, 250; by night, 500	Government ..	600, 1,800	P G	N	0·20	2·00
Pola	13° 50′ 08″ E. 44° 51′ 08″ N.	OHP	By day, 250; by night, 500	Government ..	600	O	N	—	—
Sebenico	Adriatic coast 15° 53′ 03″ E. 43° 44′ 02″ N.	OHB	By day, 250; by night, 500	Government ..	600, 1,800	P G	N	0.20	2.00
Triest	13° 45′ 30″ E. 45° 38′ 54″ N.	OHT	By day 150; by night, 300	Government (Imperial Inspectorate of the Radio-Telegraph Service, Triest)	300, 600	P G	N	0.20	2.00
ARGENTINE (REPUBLIC)									
Año Nuevo	Tierra del Fuego 64° 07′ 00″ W. 54° 39′ 00″ S.	LIG	432	Government ..	600, 1,800	O	Meridian of Cordoba[4] X	0.60	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
ARGENTINE (REPUBLIC) —*contd.*	Meridian of Greenwich.							Francs.	Francs.
Buenos Aires	—	—	—	—	—				
Cabo de las Virgenes ..	Entrance to the Strait of Magellan 68° 23′ 00″ W. 52° 22′ 00″ S.	LIF	324	Government ..	**600**	G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Campo Mayo	34° 32′ 00″ W. 58° 40′ 00″ S.	LIL	—	Government ..	—				
Darsena Norte	Buenos Aires (Town) 58° 22′ 05″ W. 34° 35′ 40″ S.	LIA	432	Government ..	**600**	P G	N	0.60	6.00
Darsena Sud	Buenos Aires (Town) 58° 22′ 05″ W. 34° 36′ 40″ S.	LIK	270	Government ..	**600**	O	X	0.60	6.00
Faro Mogotes	Province of Buenos Aires 57° 29′ 00″ W 38° 08′ 00″ S.	LIC	270	Government ..	**600**	P G	9 a.m. to 4 p.m. 8 p.m. to 12 p.m.	0.60	6.00
Faro Recalada	Rio de la Plata 56° 43′ 00″ W. 35° 11′ 00″ S.	LID	216	Government ..	**600**	P G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Formosa Argentina ..	Government of Formosa 58° 12′ 00″ W. 26° 10′ 00″ S.	LIJ	270	Government ..	450 **600**	O	9 a.m. to 4 p.m. 8 p.m. to 12 p.m.	0.60	6.00
M. Guerra	34° 35′ 00″ W. 58° 22′ 00″ S.	LIN	—	Government ..	—				
Mendoza	32° 53′ 00″ W. 68° 50′ 00″ S.	LIM	—	Government ..	—				
Paz, Entre Rios (La) ..	Province of Entre Rios 59° 38′ 00″ W. 30° 45′ 00″ S.	LII	270	Government ..	450, **600**	O	9 a.m. to 4 p.m. 8 p.m. to 12 p.m.	0.60	6.00
Puerto Militar	Province of [illegible]	LIE	270	Government ..	**600**	P G	9 a.m. to 4 p.m. 8 p.m. to 12 p.m.	0.60	6.00

Rio Santiago, Buenos Aires	57° 53′ 05″ W. 34° 51′ 00″ S.						8 p.m. to 12 p.m.		
Ushuaia	Tierra del Fuego 68° 20′ 00″ W. 54° 48′ 00″ S.	LIH	324	Government ..	600	P G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
BELGIAN CONGO									
Banana	Lower Congo 12° 27′ 06″ E. 6° 00′ 21″ S.	ONA	400–1 000	Congo State ..	300, 600	P G	Greenwich Time, 7 p.m. to 1.30 a.m., 2 p.m. to 5 p.m.[5] Holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.[5]	0.30	—
Basoko	Aruwimi 23° 36′ 00″ E. 1° 14′ 00″ N.	OQO	300	Congo State ..	900, 1,200	—[6]	7 a.m. to 11.30 a.m. 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Boma	Lower Congo 13° 06′ 00″ E. 5° 51′ 00″ S.	OQB	300	Congo State ..	900, 1,200	—[6], [7] ..	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Coquilhatville	Equateur 18° 18′ 00″ E. 0° 04′ 00″ N.	OQC	300	Congo State ..	900, 1 200	—[6]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Elisabethville	Upper Luapula 27° 31′ 00″ E. 11° 38′ 00″ S.	OQH	300	Congo State ..	900, 1,200	—[6]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Kikondja	Tanganika, Moero 26° 25′ 00″ E. 8° 15′ 00″ S.	OQK	300	Congo State ..	900, 1,200	—[6]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Kindu	Maniema 25° 56′ 00″ E. 2° 56′ 00″ S.	OQD	300	Congo State ..	900, 1,200	—[6]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
BELGIAN CONGO—*contd.*								Francs.	Francs.
Kongolo	Meridian of Greenwich. Tanganika, Moero 26° 59′ 00″ E. 5° 23′ 00″ S.	OQG	300	Congo State ..	**900**, 1,200	—*	Greenwich time 7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Léopoldville	Middle Congo 15° 18′ 00″ E. 4° 20′ 00″ S.	OQL	10	Congo State ..	300	—*	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Lisala	Bangala 21° 34′ 00″ E. 2° 08′ 00″ N.	OQI	300	Congo State ..	**900**, 1,200	—*	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Stanleyville	Stanleyville 25° 14′ 00″ E. 0° 30′ 00″ N.	OQS	300	Congo State ..	**900**, 1,200	—*	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
BELGIUM									
Antwerp (Quai du Rhin)	4° 25′ 00″ E. 51° 13′ 00″ N.	OQR	—	S.A.I.T.	—	For Emergency Signals	—	—	—
Nieuport	North Sea Coast 2° 43′ 15″ E. 51° 09′ 10″ N.	OST	By day, 220; by night, 540	Government ..	300, **800**	P G	N	0.20*	2.00*
BOLIVIA									
Cobija									

	38° [illegible]' 00" W. 13° 01' 00" S.		[illegible]	Government ..	[illegible], 1,800	P G	N	0.60 [9]	6.00 [9]
Babylonia..	Rio de Janeiro 43° 10' 10" W. 22° 55' 40" S.	SPY	110	Government ..	300	P G	6 a.m. to 12 p.m.	0.60 [10]	6.00 [10]
Cap S. Thomé	41° 00' 00" W. 22° 03' 00" S.	SPT	270	Government ..	600	P G	N	0.60 [11]	6.00 [11]
Fernando de Noronha ..	32° 25' 12" W. 3° 50' 30" S.	SPN	220, 540	Government ..	600, 1.800	P G	N	0.60 [12]	6.00 [12]
Guaratiba [13]	South-West of Rio de Janeiro 43° 31' 00" W. 23° 04' 00" S.	SNX	27	Government ..	300	O	—	—	—
Ilha das Cobras	Rio de Janeiro Bay 43° 09' 00" W. 2.° 52' 00" S.	ICL	110	Government ..	300	O	—	—	—
Ilha dos Abrolhos ..	—	—	—	—	—	—	—	—	—
Itapura	—	—	—	—	—	—	—	—	—
Juncçao	Rio Grande do Sul 52° 07' 00" W. 32° 04' 00" S.	SPJ	270	Government ..	600	P G	6 a.m. to 12 p.m.	0.60 [14]	6.00 [14]
Ladario	—	—	—	—	—	—	—	—	—
Lagôa	Isle of S. Catharina 48° 20' 00" W. 27° 35' 00" S.	SPL	160	Government ..	600	P G	6 a.m. to 12 p.m.	0.60 [15]	6.00 [15]
Mánaos	3° 00' 00" S. 60° 00' 00" W.	SQM	—	Madeira-Mamoré Railway Co.	—	—	—	—	—
Mocanguê	Rio de Janeiro Bay 43° 09' 00" W. 22° 52' 00" S.	MCG [9]	27	Government ..	300	O	—	—	—
Monte Serrat	Near Santos 46° 19' 34" W. 23° 56' 27" S.	SPS	110	Government ..	300	P G	N	0.60 [17]	6.00 [17]
Olinda, Pernambuco ..	Near Pernambuco 34° 51' 10" W. 8° 02' 00" S.	SPO	270	Government ..	600	P G	6 a.m. to 12 p.m.[18]	0.60 [19]	6.00 [19]
Para	—	SPB	—	—	—	—	—	—	—
Ponta Negra [13]	East of Rio de Janeiro 42° 39' 00" W. 22° 55' 00" S.	PNA	27	Government ..	300	O	—	—	—
Porto Velho	8° 45' 00" S. 63° 35' 00" W.	SQV	—	Madeira-Mamoré Railway Co.	—	—	—	—	—
Puerto Murtinho	—	—	—	—	—	—	—	—	—
Raza [13]	Entrance to the Bay of Rio de Janeiro. 43° 08' 00" W. 23° 04' 00" S.	SNZ	110	Government ..	300	O	—	—	—
Rio de Janeiro	—	—	—	—	—	—	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Cal Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
BRAZIL—*contd.*	Meridian of Greenwich.						Mean time of Rio de Janeiro.	Francs.	Francs.
Santo Martha	—	—	—	—	—	—	—	—	—
Santorem	—	SQS	—	—	—	—	—	—	—
Villegaignon	Rio de Janeiro Bay 43° 09′ 00″ W. 22° 52′ 00″ S.	SNV	27	Government ..	300	O	—	—	—
BRITISH GUIANA									
Demerara	58° 11′ 00″ W. 6° 49′ 24″ N.	VPA	430	W. I. & Panama Tel. Co.	600	P G[30]	Local time: 8 a.m. to 12 a.m., 2 p.m. to 5 p.m.	0.60	—
BRITISH INDIA									
Allahabad..	—	—	—	—	—	—	—	—	—
Bassein	94° 43′ 00″ E. 16° 44′ 00″ N.	VTB	300	Government ..	960	—[31]	Meridian of 97° 30′ E[32]: 7 a.m. to 4 p.m. Sundays: 8 a.m. to 9 a.m., 5 p.m. to 6 p.m.	—	—
Bombay Radio	72° 54′ 00″ E. 18° 55′ 00″ N.	VWB	300	Government ..	300 **600**	P G[33 34] ..	N	0.35	—
Calcutta Radio	88° 25′ 00″ E. 22° 35′ 00″ N.	VWC	300	Government ..	300 **600**	P G[30 35] ..	N	0.35	—
Delhi	—	—	—	—	—	—	—	—	—
Diamond Island	Mouths of the Irawadi 94° 15′ 00″ E. 15° 51′ 00″ N.	VTD	300	Government ..	300, **600**	P G[33 35] ..	N	0.35	—
Jask	57° 45′ 40″ E. 25° 38′ 12″ N.	VTJ	500	Government ..	300, **600**	P G	Local time[36]: 6 a.m. to 12 p.m.	0.40	—
Karachi Radio	Mouths of the Indus 67° 00′ 00″ E. 24° 50′ 00″ N.	VWK	300	Government ..	300, **600**	P G[33 34] ..	N	0.35	—
Lahore	—	—	—	—	—	—	—	—	—
Madras	—	—	—	—	—	—	—	—	—
Mergui	Lower B[illegible] 98° [illegible]	VTM	300	Government ..	670	—[31]	N	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Secunderabad	—	—	—	—	—	—	—	—	—
Simla	—	—	—	—	—	—	—	—	—
Table Island	At the north of the Andaman Islands 93° 21′ 15″ E. 14° 11′ 00″ N.	VTT	300	Government ..	300, **600**	P G[illegible]	Meridian of 97° 30′ E[illegible]: 7 a.m. to 4 p.m. Sundays: 8 a.m. to 9 a.m., 5 p.m. to 6 p.m. N	0.35	—

	Island 92° 45′ 00″ E. 11° 41′ 00″ N.						p.m. Sundays: 8 a.m. to 9 a.m., 5 p.m. to 6 p.m.		
Quetta	—	—	—	—	—	—	—	—	—
Sandheads	At the south of the Ganges Delta 88° 09′ 00″ E. 21° 00′ 00″ N.	VWS	200	Government ..	300, 600	P G [22]	Meridian of 82° 30′ E [27]: 6.36 a.m. to 6.36 p.m.	0.35	—
Secunderabad	—	—	—	—	—	—	—	—	—
Simla	—	—	—	—	—	—	—	—	—
Table Island	At the north of the Andaman Islands 93° 21′ 15″ E. 14° 11′ 00″ N.	VTT	300	Governme..t ..	300, 600	P G [23 24] ..	Meridian of 97° 30′ E [28]· 7 a.m. to 4 p.m. Sundays: 8 a.m. to 9 a.m., 5 p.m. to 6 p.m.	0.35	—
Victoria Point	Extreme south of Lower Burma 98° 32′ 30″ E. 9° 59′ 00″ N.	VTV	300	Government ..	300, 600, 700	P G [21 25] ..	N	0.35	—
BRITISH SOMALILAND									
Aden Radio	Arabia 45° 03′ 00″ E. 12° 46′ 00″ N.	VPI	250	Colonial Office ..	600	P G [25]	Time of the Meridian of Aden, 3 hours in advance of Greenwich time 6 a.m. to 6 p.m., 8 p.m. to 8.30 p.m.	0.60	
Berbera Radio	45° 01′ 30″ E. 10° 26′ 00″ N.	VPJ	250	Colonial Office ..	600	P G [30]	6 a.m. to 6 p.m.	0.60 [33]	— [33]
Bulhar	—	—	—	Colonial Office ..	—	—	—	—	—
BRITISH WEST INDIES									
Bermuda	64° 45′ 00″ W. 32° 20′ 00″ N.	BZB	—	Government ..	—	O . ..	—	—	—
Jamaica (Bowden) ..	76° 19′ 00″ W. 17° 53′ 00″ N	VPH	200	Government ..	600	P G	Local time [31]: 7 a.m. to 7 p.m.	0.60	6.00
Nassau, Bahamas ..	Bahama Islands 77° 22′ 00″ W. 25° 04′ 00″ N.	VPN	400	Government ..	600, 1 800	P G	Time of the Meridian 75° west of Greenwich: 7 a.m. to 3 p.m.	—	—
Tobago	60° 40′ 00″ W. 11° 12′ 00″ N.	VPM	85	Government ..	600	P G [36]	Local time: 8 a.m. to 5 p.m. Sundays and public holidays: 8 a.m. to 12 a.m.	0.60 [38]	— [38]
Trinidad	61° 35′ 00″ W. 10° 45′ 00″ N.	VPL	260	Government ..	600	P G [34]	Local time: 8 a.m. to 10 p.m.	0.60 [38]	— [32]

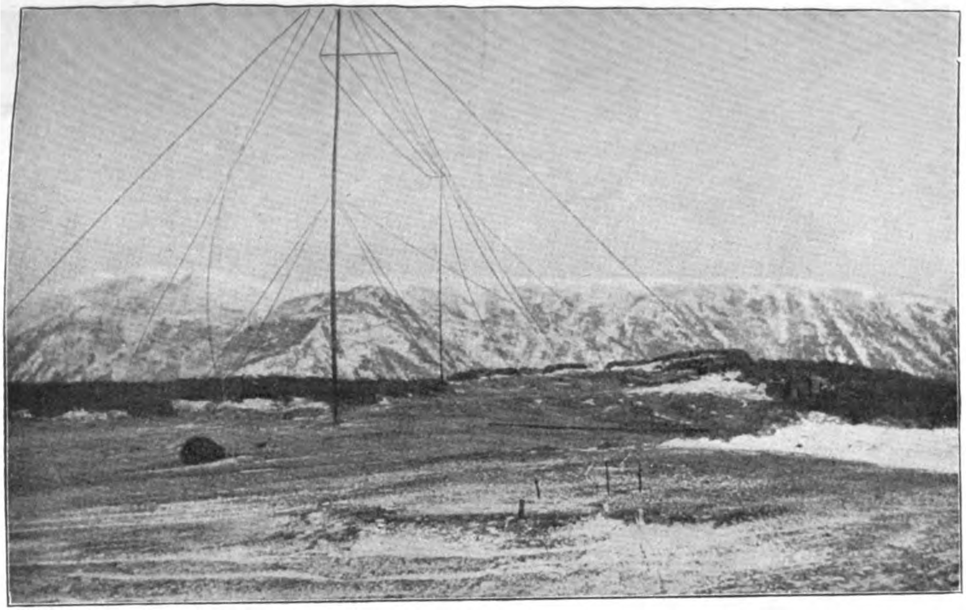
Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
BULGARIA									
Varna	Meridian of Greenwich. 27° 55′ 00″ E. 43° 12′ 00″ N.	FRG	270	Government ..	300, **600**	P G	Eastern European time 9 a.m. to 12 a.m., 2 p.m. to 6 p.m.	Francs. 0.30	Francs. 3.00
CANADA [46] AND NEWFOUNDLAND									
Alert Bay	Queen Charlotte Sound Cormorant Island 126° 55′ 50″ W. 50° 35′ 15″ N.	VAF	500	Government ..	300, **600**, 1,600	P G	N	0.60 [41]	6.00 [41]
American Tickle	53° 14′ 00″ N. 55° 41′ 00″ W.	VOC	116	Marconi Co. ..	600	P G [46, 2] ..	8 a.m. to 8 p.m.	0.60	6.00
Battle Harbour	52° 17′ 00″ N. 55° 36′ 00″ W.	VOA	175	Marconi Co. ..	300, 600	P G [46, 2] ..	8 a.m. to 8 p.m.	0.60	6.00
Belle Isle	To the north of Newfoundland 55° 21′ 49″ W. 51° 52′ 53″ N.	VCM	230	Marconi Co. [35] ..	300, **600**	P G	N	0.30 [35]	3.00 [35]
Camperdown	Halifax, Nova Scotia 63° 33′ 00″ W. 44° 31′ 20″ N.	VCS	230	Marconi Co. ..	300, **600**	P G [35]	N	0.30 [35, 37]	3.00 [35, 37]
Cape Bear	Prince Edward Island 62° 27′ 15″ W. 46° 00′ 45″ N.	VCP	130	Marconi Co. ..	300, **600**	P G	N [38]	0.15 [35]	1.50 [35]
Cape Harrison	54° 52′ 00″ N. 58° 03′ 00″ W.	VOH	175	Marconi Co. ..	600	P G [41, 2] ..	8 a.m. to 8 p.m.	0.60	6.00
Cape Lazo	Vancouver Island 124° 53′ 00″ W. 49° 42′ 30″ N.	VAC	150	Government, Naval ..	300, **600**, 1,600	P G	N	0.60 [39, 40, 41]	6.00 [39, 40, 41]
Cape Race	Newfoundland 53° 04′ 17″ W. 46° 39′ 24″ N.	VCE	350	Marconi Co. ..	300, **600**, 1,600	P G	N	0.85 [35]	8.50 [35]
Cape Ray	Newfoundland 59° 18′ 00″ W. 47° 37′ 00″ N.	VCR	270	Marconi Co. ..	300, **600**, 1,600	P G	N [42]	0.30 [35]	3.00 [35]
Cape Sable	Nova Scotia 65° 37′ 15″ W.	VCU	230	Marconi Co. ..	300, **600**	P G [43]	N	0.85 [35, 37]	8.50 [35, 37]

Dead Tree Point	Queen Charlotte Islands 131° 56' 30" W. 53° 21' 30" N.	VAH	220	Marconi Co. ..	300, 600	P G	8 a.m. to 6 p.m.[44]	0.60[39 41]	6.00[39 41]
Digby Island (*see* PRINCE RUPERT)	—	VAJ	—	—	—	—	—	—	—
Domino	53° 28' 00" N. 55° 44' 00" W.	VOD	175	Marconi Co. ..	600	P G[46a] ..	8 a.m. to 8 p.m.	0.60	6.00
Estevan, British Columbia	Vancouver Island 126° 32' 22" W. 49° 22' 05" N.	VAE	105	Government, Naval	300, 600, 1,600	P G	N	0.60[39 41]	6.00[39 41]
Fame Point	Gulf of St. Lawrence 64° 36' 20" W. 49° 06' 48" N.	VCG	230	Marconi Co. ..	300, 600	P G	N[42]	0.30[35]	3.00[35]
Father Point	River St. Lawrence 68° 27' 40" W. 48° 31' 30" N.	VCF	230	Marconi Co. ..	300, 600	P G	N[42]	0.15[35]	1.50[35]
Fogo	49° 40' 00" N. 53° 57' 00" W.	VOJ	288	Marconi Co. ..	300, 600	P G[46a] ..	8 a.m. to 8 p.m.	0.60	6.00
Glace Bay..	Nova Scotia 46° 12' 00" N. 59° 58' 00" W.	GB	3,125	Marconi Co. ..	9,000	—	—	T.	A.
Grady	53° 48' 00" N. 56° 23' 00" W.	VOB	175	Marconi Co. ..	600	P G[46a] ..	8 a.m. to 8 p.m.	0.60	6.00
Grinstone (*see* MAGDALEN ISLANDS)	—	VCN	—	—	—	—	—	—	—
Grosse Isle, Quebec ..	River St. Lawrence 70° 40' 00" W. 47° 02' 10" N.	VCD	95	Marconi Co. ..	300, 600	P G	N	0.15[35]	1.50[35]
Halifax Dockyard ..	—	VAA	—	Government ..	—	—	—	—	—
Harrington	Strait of Belle Isle 59° 30' 00" W. 50° 31' 00" N.	VCJ	130	Marconi Co. ..	300, 600	P G	N[42]	0.30[35]	3.00[35]
Heath Point	Anticosti 61° 42' 50" W. 49° 05' 20" N.	VCI	230	Marconi Co. ..	300, 600	P G	N[42]	0.30[35]	3.00[35]
Holton	54° 35' 00" N. 57° 15' 00" W.	VOG	175	Marconi Co. ..	600	P G[46a] ..	8 a.m. to 8 p.m.	0.60	6.00
Ikeda Head	Queen Charlotte Islands 131° 07' 30" W. 52° 17' 00" N.	VAI	250	Government, Naval ..	[illegible]	P G	8 a.m. to 12 p.m.[44]	0.60[39 41]	6.00[39 41]
Kingston, Ontario ..	44° 12' 00" N. 76° 30' 00" W.	—	345	—	600, 1,600	P G	N	0.15	1.50
Le Pas, Man.	53° 00' 00" N. 102° 00' 00" W.	VBM	519	Marconi Co. ..	—	— ..	—	0.85	8.50
Magdalen Islands ..	Gulf of St. Lawrence 61° 54' 20" W. 47° 23' 00" N.	VCN	130	Marconi Co. ..	300, 600	P G	8 a.m. to 6 p.m.[45]	0.30[35]	3.00[35]

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
CANADA AND NEWFOUNDLAND—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Makkovik	55° 13′ 00″ N. 59° 08′ 00″ W.	VOI	175	Marconi Co. ..	**600**	P G [46,2] ..	8 a.m. to 8 p.m.	0.60	6.00
Midland, Ontario.. ..	Georgian Bay 79° 51′ 35″ W. 44° 44′ 20″ N.	VBC	500	Marconi Co. ..	300 **600**, 1,600	P G	N	0.15 [35]	1.50 [35]
Montreal	73° 32′ 15″ W. 45° 32′ 30″ N.	VCA	190	Marconi Co. ..	300, **600**	P G	N [48]	0.15 [35]	1.50 [35]
North Sydney, Nova Scotia	Cape Breton Island 60° 14′ 00″ W. 46° 13′ 30″ N.	VCO	130	Marconi Co. ..	300, **600**	P G	N	0.30 [35]	3.00 [35]
Pachena	Vancouver Island 125° 06′ 20″ W. 48° 43′ 40″ N.	VAD	250	Government, Naval	300, **600**, 1,600	P G	N	0.60 [39 41]	6.00 [39 41]
Partridge Island	St. John, New Bruniwick 66° 03′ 10″ W. 45° 13′ 54″ N.	VCV	230	Marconi Co. ..	300 **600**	P G	N	0.30 [35]	3.00 [35]
Pictou, Nova Scotia ..	Northumberland Strait 62° 40′ 50″ W. 45° 43′ 00″ N.	VCQ	95	Marconi Co. ..	300, **600**	P G	N [35]	0.15 [35]	1.50 [35]
Point Amour	Labrador, Strait of Belle Isle 56° 50′ 28″ W. 51° 27′ 26″ N.	VCL	130	Marconi Co. ..	300, **600**	P G	N	0.30 [35]	3.00 [35]
Point Burwell	42° 40′ 00″ N. 80° 48′ 00″ W.	—	345	—	**600**, 1,600	P G	N	0.15	1.50
Point Edward (Garnia) ..	Ontario, to the south of Lake Huron 82° 24′ 53″ W. 43° 00′ 09″ N.	VBE	500	Marconi Co. ..	300, **600**, 1,600	P G	N	0.15 [35]	1.50 [35]
Point Grey	Near Vancouver 123° 14′ 30″ W. 49° 16′ 30″ N.	VAB	105	Government, Naval	300, **600**	P G	N	0.60 [39 40 41]	6.00 [39 40 41]
[illegible]	[illegible]	[illegible]	[illegible]	Marconi Co. ..	300, **600**	P G	N [48]	0.30 [35]	3.00 [35]



The Wireless Telegraph Station on North Head, Macquerie Island, through which Dr. Mawson, the leader of the Australian Antarctic Expedition, was able to keep in touch with the outside world.

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Port Colburn	—	—	—	—	—	—	—	—	—
Port Nelson (Hudson Bay)	52° 75′ 00″ N. 92° 50′ 00″ W.	VBN	563	Marconi Co. ..	—	—	—	—	—
Prince Rupert	British Columbia 130° 23′ 30″ W. 54° 17′ 00″ N.	VAJ	250	Government, Naval	300, 600	P G	N	0.60[39, 41]	6.00[39, 41]
Quebec	71° 13′ 40″ W. 46° 48′ 30″ N.	VCC	95	Marconi Co. ..	300, 600	P G	N	0.15[35]	1.50[35]
Sable Island	To the south-east of Nova Scotia 60° 00′ 00″ W. 43° 57′ 00″ N.	VCT	300	Marconi Co. ..	300, 600	P G[43]	N	0.85[35, 37]	8.50[35, 37]
Sault Ste. Marie, Ontario	84° 17′ 50″ W. 46° 31′ 05″ N.	VBB	500	Marconi Co. ..	300, 600, 1,600	P G	N	0.15[35]	1.50[35]
Smokey Tickle	54° 26′ 00″ N. 57° 11′ 00″ W.	VOF	175	Marconi Co. ..	600	P G[44a] ..	8 a.m. to 8 p.m.	0.60	6.00
St. John (*see* PARTRIDGE ISLAND)	—	VCV	—	—	—	—	—	—	—
Three Rivers, Quebec ..	River St. Lawrence to the south-east of Quebec 72° 33′ 00″ W. 46° 20′ 40″ N.	VCB	130	Marconi Co. ..	300, 600	P G	N[42]	0.15[35]	1.50[35]
Tobermory, Ontario ..	Entrance of Georgian Bay 81° 39′ 40″ W. 45° 15′ 50″ N.	VBD	500	Marconi Co. ..	300, 600, 1,600	P G	N	0.15[35]	1.50[35]
Toronto	43° 40′ 00″ N. 79° 28′ 00″ W.	—	345	—	600. 1 600	P G	N	0.15	1.50
Triangle Island[d]	British Columbia Queen Charlotte Sound 129° 05′ 00″ W. 50° 52′ 00″ N.	VAG	350	Government, Naval	300, 600	P G	N	0.60[39, 41]	6.00[39, 41]
Venison Island	52° 58′ 00″ N. 55° 46′ 00″ W.	VOB	116	Marconi Co. ..	600	P G[44a] ..	8 a.m. to 8 p.m.	0.60	6.00
Victoria, British Columbia	123° 20′ 00″ W. 48° 24′ 30″ N.	VAK	200	Government, Naval	300, 600	P G	N	0.60[33, 40, 41]	6.00[33, 40, 41]
CEYLON									
Colombo Radio	79° 53′ 00″ E. 6° 55′ 00″ N.	VPB	390	Government ..	300, 600	P G	N	0.35	—
CHILI									
Ancud	4° 52′ 00″ S. 7° 52′ 00″ W.	—	—	Government ..	—	P G	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
CHILI—*cont.*	Meridian of Greenwich.							Francs.	Francs.
Antofagasta	70° 31′ 30″ W. 23° 27′ 35″ S.	CCB	400	Government ..	**600**, 1,300	O	N	—	—
Arica	70° 20′ 35″ W. 18° 29′ 00″ S.	CCA	400	Government ..	**600**, 1,300	O	N	—	—
Cape Raper	75° 38′ 00″ W. 45° 50′ 00″ S.	CCR	—	Government ..	—	P G	—	—	—
Coquimbo	71° 20′ 00″ W. 29° 57′ 35″ S.	CCO	400	Government ..	**600**, 1,300	O	N	—	—
Escuela Valparaiso ..	—	CCN	27	Naval School ..	—	O	—	—	—
Evangelistas	74° 50′ 00″ W. 52° 47′ 00″ S.	CCZ	—	Government ..	—	P G	—	—	—
Huafo	74° 39′ 00″ W. 43° 41′ 00″ S.	CCH	—	Government ..	—	P.G	—	—	—
Juan Fernandez	78° 53′ 00″ W. 33° 37′ 00″ S.	CCJ	—	Government ..	—	P G	—	—	—
Llanquihue	72° 55′ 00″ W. 41° 32′ 00″ S.	CCL	—	Government ..	—	O	—	—	—
Mocha	73° 53′ 44″ W. 38° 22′ 12″ S.	CCM	300	Government .	600	O	10 a.m. to 12 a.m.[46] 4 p.m. to 6 p.m.	—	—
Punta Arenas	70° 50′ 00″ W. 53° 10′ 00″ S.	CCP	—	Government ..	—	O	—	—	—
Salinas (Las)[46]	—	WLS	10	Government .	—	O	—	—	—
Talcahuano	73° 05′ 35″ W. 36° 44′ 00″ S.	CCT	700	Government .	**600**, 1,300	O	N[47]	—	—
Valparaiso	78° 38′ 06″ W. 33° 01′ 06″ S.	CCV	300	Government, Naval	**600**, 1 300	O[47]	N	—	—
CHINA									
Peking[1]	116° 30′ 20″ E. 39° 54′ 50″ N.	NPP	150	U.S. Navy ..	600	O	N	—	—
Quang-Tchéou-Wan ..	110° 27′ 15″ E., Greenwich [illegible]	FWA	500	French Govt. ..	**600**, 1 200	P G, O ..	Seventh time-belt east of the Greenwich belt: 7 a.m. [illegible]	0.25	2.00

	12° 05′ 24″ N.								
COLUMBIA									
Cartagena..	—	CTG	—	Ges. Fur Drahtlose Tel.	600	—	6 a.m to 1 p.m.	0.50	—
CURACAO (COLONY OF)									
Aruba	Dutch West Indies 70° 02′ 01″ W. 12° 31′ 05″ N.	PJA	108	—	600	—[51] ..	Local time. 9 a.m. to 11 a.m., 2 p.m. to 4 p.m. Sundays and public holidays: 11.45 a. . to 12.45 p.m.	0.60	—
Bonaire	Dutch West Indies 68° 16′ 15″ W. 12° 09′ 20″ N.	PJB	108	—	600	—[51] ..	9 a.m. to 11 a.m., 2 p.m. to 4 p.m. Sundays and public holidays: 11.45 a.m. to 12 45 p.m.	0.60	—
Curaçao	Dutch West Indies 68° 56′ 35″ W. 12° 06′ 20″ N.	PJC	270	—	600	P G[53]	5 a.m. to 7 p.m. and 12 p.m. Sundays and public holidays: 5 a.m. to 6 a.m. and 12 a.m., 6 p.m to 7 p.m. and 12 p.m.	0.60	—
DENMARK									
Blaavandshuk Lighthouse	North Sea coast 8° 05′ 11″ E. 55° 33′ 29″ N.	OXB	30	Government ..	200	P G[53]	N	0.15	—
Copenhagen	12° 34′ 40″ E. 55° 41′ 13″ N.	OXA	By day, 200; by night, 500	Government ..	600	P G	N	0.15	—
Drogden Lighthouse ..	The Sound 12° 42′ 00″ E. 55° 33′ 02″ N.	OUW	15	Government ..	300	—[53]	N	—	—
Gedser	Falster Island 11° 55′ 52″ E. 54° 34′ 10″ N.	OXC	25	Government ..	250	—[53]	in general N	—	—
Gedser Havn	Falster Island 11° 56′ 03″ E. 54° 32′ 04″ N.	OXD	25	Government ..	250	—[53]	in general N	—	—
Graadyb Lighthouse ..	North Sea 8° 07′ 07″ E. 55° 21′ 07″ N.	OUX	30	Government ..	200	—[53]	N	—	—
Horns Rev Lighthouse ..	North Sea 7° 19′ 05″ E. 55° 34′ 01″ N.	OUZ	30	Government ..	200	—[53]	N	—	—

Land Stations—*Continued.*

Name.	Geographical Position.	Call Signal	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
DENMARK—*contd.*								Francs.	Francs.
Vyl Lighthouse	Meridian of Greenwich. North Sea 7° 45′ 09″ E. 55° 23′ 06″ N.	OUY	30	Government ..	200	—[55]	N	—	—
DUTCH EAST INDIES									
Ambon	Ambon Island	PKL	—[1]	Government ..	—	P G[54]	—	—[55]	—[55]
Balikpapan	1° 19′ 00″ S. 116° 57′ 00″ E.	—	—	Royal Dutch Petroleum Co.	—	P G[54]	—	—[55]	—[55]
Koepang	Timor	PKD	—	Government ..	—	P G[54]	—	—[55]	—[55]
Sabang	Sumatra, Web Island 95° 20′ 06″ E. 5° 54′ 00″ N.	PKA	By day, 400; by night, 800	Government ..	450, **600**	P G	N	0.40	4.00
Sitoebondo	Java	PKC	—	Government ..	—	P G[54]	—[1]	—[55]	—[55]
Tarakan	3° 20′ 00″ N. 117° 30′ 00″ E.	—	—	Royal Dutch Petroleum Co.	—	—	—	—	—
Weltevreden	Near Batavia 106° 50′ 20″ E. 6° 09′ 40″ S.	PKB	270	Government Marine Dept.	**600**	P G, O.. ..	Mean time of the Island of Java, 109° 48′ 37′05″ east of Greenwich week days (except Thursdays): 8 a.m. to 6 p.m. Thursdays: 8 a.m. to 9 p.m. Sundays and holidays: 9 a.m. to 1 [illegible]	0.40	4.00
EGYPT									
Port Said	32° 19′ 00″ E. 31° 14′ 00″ N.	SUB	350	Lloyds	300.	.. ..	N	0.60	—
ERITREA									
Asmara	—	—	—	Government ..	—	—	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	Government ..	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Red Sea	ICX	1,600	Government ..	4,000	[illegible]	X	[illegible]	[illegible]

Port Stanley	[illegible] 51° 41' 15" S.	[illegible]	[illegible]	Government ..	300, 600	P G	9 a.m. to 12 a.m., 9 p.m. to 12 p.m.	0.60	—
FIJI ISLANDS							Fiji Islands time.[89]		
Labasa	179° 24' 00" E. 16° 26' 00" S.	VPB	300	Col. Government	600	P G[88]	—[90]	0.60	—
Suva	Viti Levu 178° 27' 30" E. 18° 08' 55" S.	VPD	300	Col. Government	600	P G[88]	—[90]	0.60	—
Suva Suva	—	—	—	Col. Government	—	P G	—	—	—
Taveuni	179° 59' 15" W. 16° 46' 30" S.	VPF	200	Col. Government	600	P G[88]	—[90]	0.60	—
FRANCE AND ALGERIA							Western European time.		
Aïn-el-Turk	To the west of Oran 0° 39' 00" W., Greenwich 2° 59' 00" W., Paris 35° 42' 00" N.	FUO	—	Navy	—	O	9 a.m. to 12 p.m.	—	—
Ajaccio, TSF	8° 44' 00" E., Greenwich 6° 24' 00" E. Paris 41° 55' 00" N.	FFA	350	Navy	600	P G	7 a.m. to 10 p.m.	0.40[61]	—[61]
Boulogne-sur-Mer, TSF ..	1° 37' 00" E., Greenwich 0° 43' 00" W. Paris 50° 43' 00" N.	FFB	160	Government ..	800, 600	P G	N	0.40[62]	—[62]
Bouscat, TSF	Near Bordeaux 0° 37' 12" W. Greenwich 2° 57' 26" W. Paris 44° 52' 27" N.	FFX	160	Government	800, 600	P G	N	0.40	—
Brest-Arsenal[63]	4° 29' 00" W., Greenwich 6° 40' 00" W., Paris 48° 23' 00" N.	FUB	—	Navy	—	—[63]	—	—	—
Brest-Kerlaer	4° 33' 20" W., Greenwich 6° 53' 34" W., Paris 48° 19' 58" N.	FFK	350	Navy	600	P G	7 a.m. to 10 p.m.	0.40	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge
								Francs.	Francs.
FRANCE AND ALGERIA—*contd.* Cherbourg, TSF	Meridian of Greenwich. 1° 38′ 00″ W. Greenwich 3° 58′ 00″ W., Paris 49° 39′ 00″ N.	FFC	350	Navy	**600**	P G	Western European time. N	0.40[62]	—
Cros-de-Cagnes	To the west of Nice 7° 10′ 00″ E., Greenwich 4° 50′ 00″ E., Paris 43° 39′ 00″ N.	FFG	160	Government ..	300, **600**	P G	N	0.40[61]	—[61]
Dieppe[64]	1° 05′ 00″ E., Greenwich 1° 15′ 00″ W., Paris 49° 55′ 00″ N.	FFI	55	Railway Administration	**400**	P	10 a.m. to 2 p.m., 8.30 p.m. to 11.30 p.m.	—	—
Dunkerque, TSF ..	2° 22′ 00″ E., Greenwich 0° 02′ 00″ E., Paris 51° 02′ 00″ N.	FFD	350	Navy	**600**	P G	7 a.m. to 10 p.m.	0.40[62]	—[62]
Eiffel Tower, Paris ..	—	FL	—	Army	—	—	—	—	—
Fort-de-l'Eau	To the east of Algiers 3° 11′ 00″ E., Greenwich 0° 51′ 00″ E., Paris 36° 45′ 00″ N.	FFO	380	Government ..	300 **600**	P G	N	0.40[61]	—[61]
Lorient, TSF	3° 21′ 00″ W., Greenwich 5° 41′ 00″ W., Paris 47° 44′ 00″ N.	FFL	350	Navy	**600**	P G	7 a.m. to 10 p.m.	0.40	—
Ouessant	To the west of Finistère 5° 04′ 00″ W., Greenwich 7° 24′ 00″ W., [illegible]	FFF	380	Government ..	300, **600**	P G	N	0.40	—

Porquerolles	Hyères Islands 6° 12′ 00″ E., Greenwich 3° 52′ 00″ E., Paris 42° 59′ 00″ N.	...	[illegible]						
Port-Vendres [63]	Gulf of the Lion 3° 06′ 00″ E., Greenwich 0° 46′ 00″ E., Paris 42° 31′ 00″ N.	FUV	—	Navy	—	—[63]	—	—	—
Rochefort	0° 58′ 00″ W., Greenwich 3° 18′ 00″ W., Paris 45° 57′ 00″ N.	FFR	350	Navy	600	P G	7 a.m. to 10 p.m.	0.40	—
S. Maries-de-la-Mer ..	Gulf of the Lion 4° 26′ 00″ E., Greenwich 2° 06′ 00″ E., Paris 43° 27′ 00″ N.	FFS	380	Government ..	300, 600	P G	N	0.40 [61]	—[61]
Toulon-Ecole [63]	5° 55′ 00″ E., Greenwich 3° 35′ 00″ E., Paris 43° 07′ 00″ N.	FUE	—	Navy	—	—[63]	—	—	—
Toulon-Mourillon ..	5° 55′ 00″ E. Greenwich 3° 35′ 00″ E., Paris 43° 07′ 00″ N.	FUT	—	Navy	—	O	9 a.m. to 12 p.m.	—	—
FRENCH EQUATORIAL AFRICA									
Loango	Congo, Pointe Noire 11° 43′ 02″ E., Greenwich 9° 22′ 48″ E., Paris 4° 46′ 49″ S	FGO	By day, 275; by night, 550	—	300, 600, 1,8 00	P G [65]	One hour in advance of Greenwich time. 8 a.m. to 10.30 a.m.[66], 2 p.m. to 4.30 p.m.[66]	0.30	3.00
FRENCH INDO-CHINA									
Cap-Saint-Jacques ..	To the South-east of Saigon 107° 05′ 14″ E., Greenwich 104° 45′ 00″ E., Paris 10° 20′ 00″ N.	FCA	250	Government ..	300	P G, O ..	Hour of the seventh time-belt east of the Greenwich belt. 7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.25	2.00

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
FRENCH INDO-CHINA—*contd.*									
Hanoi	Meridian of Greenwich. 105° 54′ 18″ E., Greenwich 103° 34′ 04″ E. Paris 21° 03′ 49″ N.	FAO	1,000	Government ..	**600**, 2,400, 3000	P G,[67] O ..	Hour of the seventh time-belt east of the Greenwich belt. 7 a.m. to 11 a.m. 2 p.m. to 5 p.m.	Francs. 0.25	Francs. 2.00
Kien-An	Near Haiphong 106° 41′ 59″ E., Greenwich 104° 21′ 45″ E., Paris 20° 48′ 34″ N.	FKA	250	Government ..	600	P G, O ..	7 a.m. to 11 a.m. 2 p.m. to 5 p.m.	0.25	2.00
FRENCH WEST AFRICA									
Conakry	Guinea 13° 42′ 46″ W., Greenwich 16° 03′ 00″ W., Paris 9° 30′ 59″ N.	FCO	By day, 540; by night, 1,600	Government ..	**600**, 1,600[68]	P G	Hour of the first time-belt west of the Greenwich belt. 6 a.m. to 10 p.m.	0.30	—
Dakar	Senegal 17° 25′ 22″ W., Greenwich 19° 45′ 36″ W., Paris 14° 40′ 27″ N.	FDA	By day, 250; by night, 450	Government ..	600	P G	N	0.30	—
Port-Etienne	Mauritania, Bay of Lévrier 17° 03′ 01″ W., Greenwich, 19° 23′ 15″ W., Paris 20° 55′ 39″ N.	FPE	By day, 540; by night, 1,600	Government ..	**600**, 900[69]	P G	from sunrise to sunset	0.30[70]	—[70]
Rufisque	Senegal 17° 16′ 23″ W., Greenwich 19° 3[illegible]′ 37″ W., Paris [illegible]	FRU	By day, 540; by night, 1,600	Government ..	1,600[71]	P R[72]	from sunrise to sunset	0.30	—

	Greenwich 9° 42′ 41″ W., Paris 4° 25′ 19″ N.						Central European time.		
GERMANY									
Adlergrund Lightship ..	Baltic Sea 14° 22′ 12″ E. 54° 49′ 59″ N.	KAG	55	—	300	P R[74, 75] ..	N	0.18	1.80
Amrumbank Lightship ..	North Sea 7° 53′ 12″ E. 54° 33′ 12″ N.	KAF	27	—	300, 600	P R[74, 75] ..	N	0.18	1.80
Aussenjade Lightship ..	North Sea 7° 56′ 40″ E. 53° 51′ 30″ N.	KAU	55	—	300	P R[74, 75] ..	N	0.18	1.80
Borkum New Lighthouse[80]	North Sea 6° 40′ 12″ E. 53° 34′ 48″ N.	KBM	100	—	300, 600	P G	N	0.18	1.80
Borkum Riff Lightship ..	North Sea 6° 03′ 30″ E. 53° 45′ 30″ N.	KBR	60	—	300, 600	P R[74, 75] ..	N	0.18	1.80
Bremerhaven Lloydhalle	North Sea coast 8° 33′ 08″ E. 53° 33′ 04″ N.	KBH	200	North German Lloyd Bremen ..	300	P R[75]	N	0.18	1.80
Bülk[77, 80]	Kiel Bay 10° 12′ 00″ E. 54° 27′ 00″ N.	KBK	110	—	300	P G	N	0.18	1.80
Cuxhaven[78, 80]	North Sea Coast 8° 42′ 42″ E. 52° 52′ 27″ N.	KCX	By day, 110; by night, 170	—	300, 600	P G	N	0.18	1.80
Danzig[80]	Baltic Coast 18° 39′ 08″ E. 54° 20′ 56″ N.	KAZ	By day, 330; by night, 660	—	300, 600, 1,800	P G	6 a.m. to 12 p.m.[7]	0.18	1.80
Eider Lightship	North Sea 8° 18′ 18″ E 54° 16′ 06″ N.	KAJ	30	—	300, 600	P R[74, 75] ..	N	0.18	1.80
Eiderlotsengaliote Lightship	North Sea 8° 37′ 00″ E. 54° 13′ 30″ N.	KCL	21	—	300, 600	P R[74, 75] ..	N	0.18	1.80
Elbe Lightship Eins ..	North Sea 8° 15′ 00″ E. 54° 00′ 30″ N.	KBF	60	—	300	P R[74, 75] ..	N	0.18	1.80
Heligoland[80]	North Sea 7° 53′ 00″ E. 54° 11′ 00″ N.	KAH	110	—	300	P R[80]	N	0.18	1.80
Norddeich[81, 80]	North Sea Coast 7° 08′ 00″ E. 53° 36′ 00″ N.	KAV	By day, 420; by night, 830	—	300, 600, 1,800	P G	N	0.18	1.80

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
GERMANY—*contd.*	Meridian of Greenwich.						Central European time.	Francs.	Francs.
Sassnitz	Island of Rügen 13° 39′ 14″ E. 54° 30′ 52″ N.	KCV	110	Prussian Railway Administration	—	P R[82 83] ..	N	0.18	1.80
Swinemünde[89]	Usedom Island 14° 15′ 13″ E. 53° 54′ 40″ N.	KAW	By day, 330; by night, 660	—	300, **600**, 1,800	P G	6 a.m. to 12 p.m.[84]	0.18	1.80
Weser Lightship	North Sea 7° 49′ 03″ E 53° 54′ 18″ N.	KCW	80	—	300	P R[74 75] ..	N	0.18	1.80
Protectorates									
Angaur	Palaos Islands 134° 10′ 15″ E. 6° 50′ 15″ N.	KAN	300	Deutsche Südsee-phosphat A.G. Bremen	**600**, 850	P G	Meridian of Shanghai: 8 a.m. to 9 a.m., 2 p.m. to 3 p.m.	0.60	6.00
Dar-es-Salaam	German East Africa 39° 17′ 27″ E. 6° 50′ 30″ S.	KAC	600	—	300, **600**, 1,800, 2,500	P G	Local time: 7.30 a.m. to 11.30 a.m., 4 p.m. to 6 p.m., 8 p.m. to 11 p.m. Sundays: 9 a.m. to 11 a.m., 8 p.m. to 10 p.m.	0.35	—
Duala	Cameroons 9° 40′ 50″ E. 4° 02′ 41″ N.	KBU	600	—	**600**, 1,650, 2500	P G[85]	Local time[86]: 6 a.m. to 9 a.m., 7 p.m. to 10 p.m.	0.35	—
Jap	Caroline Islands 138° 04′ 03″ E. 9° 29′ 45″ N.	KCA	300	Deutsche Südsee-phosphat A. G.	**600**, 800	P G	Meridian of Shanghai: 8 a.m. to 9 a.m., 2 p.m. to 3 p.m.	0.60	6.00
Lüderitzbucht	German South-West Africa 15° 10′ 50″ E. 26° 37′ 26″ S.	KCU	By day, 500; by night, 900	—	**600**, 1,650, 2500	P G	Central European time: 9 a.m. to 12 a.m., 3 p.m. to 6 p.m. Sundays: 4 p.m. to 6 p.m.	0.35	—
Nauru..	Marshall Islands [illegible]	KBN	By day, [illegible]	Deutsche Südsee Ges für drahtlose [illegible]	300, **600**, 1,800	P G	—	0.60	—

	22° 40′ 37″ S.		900				… p.m. 3 p.m. to 6 p.m., 9 p.m. to 12 p.m.		
Tsingtau (Signalberg)[87]	Shan-tung (China) 120° 19′ 27″ E. 36° 04′ 00″ N.	KBS	By day, 500; by night 1,350	—	600	P G	N	0.18	1.80
GOLD COAST									
Accra	0° 12′ 00″ W. 5° 32′ 30″ N.	VPG	250	Government ..	300, **600**	P G	Greenwich time: 8 a.m. to 4 p.m., except Sundays	0.40	—
GIBRALTAR									
Gibraltar (North Front)..	5° 21′ 00″ W. 36° 09′ 00″ N.	BYW	—	—	—	O	—	—	—
Gibraltar (Windmill Hill)..	5° 21′ 00″ W. 36° 07′ 00″ N.	BYX	—	—	—	O	—	—	—
GREAT BRITAIN							Greenwich time.		
Aberdeen	2° 07′ 00″ W. 57° 08′ 30″ N.	BYD	—	Admiralty ..	—	O	—	—	—
Ballycastle, Antrim ..	Ireland, North Channel 6° 12′ 00″ W. 55° 11′ 00″ N.	GSL	15	Post Office ..	250	—[91]	8.25 a.m. to 8.25 p.m.	—	—
Broomfield	—	MAX	—	Marconi Co. ..	—	—	—	—	—
Bunbeg	North-West Coast of Ireland 8° 09′ 00″ W. 55° 04′ 00″ N.	BYR	—	Admiralty ..	—	O	—	—	—
Butt of Lewis	58° 32′ 00″ N. 6° 14′ 00″ W.	BTL	—	Lloyds	—	Private ..	—	—	—
Caister-on-Sea	Near Yarmouth 1° 42′ 00″ E. 52° 37′ 00″ N.	GCS	150	Post Office ..	300	P G	N	0.60[92] 0.30[93] 0.15[94]	—[92] 1.80[93] 1.50[94]
Calshot	Hampshire, to the south-east of Southampton 1° 18′ 30″ W. 50° 49′ 15″ N.	BZZ	—	Admiralty ..	—	O	—	—	—
Carnarvon	Wales	—	—	Marconi Co. ..	—	—	—	—	—
Chelmsford	—	MZX	—	Marconi Co. ..	—	—	—	—	—
Cleethorpes	South-east of Grimsby 0° 02′ 00″ W. 53° 31′ 00″ N.	BYB	—	Admiralty ..	—	O	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
GREAT BRITAIN—*contd.*	Meridian of Greenwich.						Greenwich time	Francs.	Francs.
Clifden	West coast of Ireland	MFT	—	Marconi Co. ..	—	Transatlantic service	—	—	—
Corkbeg	Entrance to Port of Cork 8° 15′ 00″ W. 51° 49′ 00″ N.	BYQ	—	Admiralty ..	—	O	—	—	—
Cromarty	Black Isle 4° 01′ 30″ W. 57° 41′ 45″ N.	BZV	—	Admiralty ..	—	O	—	—	—
Crookhaven	South Coast of Ireland 9° 46′ 00″ W. 51° 27′ 00″ N.	GCK	250	Post Office ..	**600**	PG	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Cross Sand Lightship ..	North-east of Yarmouth 1° 54′ 00″ E. 52° 38′ 00″ N.	GVA	15	Trinity House ..	**230**	Reception and transmission of distress signals	N	— [95]	— [95]
Cullercoats	Near Tynemouth 1° 26′ 00″ W 55° 02′ 00″ N.	GCC	350	Post Office ..	**600**	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Culver Cliff	Isle of Wight 1° 06′ 00″ W. 50° 40′ 00″ N.	BYM	—	Admiralty ..	—	O	—	—	—
Dover	1° 18′ 00″ E. 51° 07′ 00″ N.	BYL	—	Admiralty ..	—	O	—	—	—
Eastchurch	Isle of Sheppey 0° 51′ 00″ E. 51° 23′ 30″ N.	BZU	—	Admiralty ..	—	O	—	—	—
East Goodwin Lightship	Straits of Dover 1° 36′ 00″ E. 51° 13′ 00″ N.	GVB	15	Trinity House ..	**230**	Reception and transmission of distress signals	N	0— [95]	— [95]
Farnborough	Hampshire 0° 45′ 30″ W. 51° 17′ 00″ N.	BZT	—	Admiralty ..	—	O	—	—	—
Fastnet	51° 23′ 00″ N. 9° 36′ 00″ W.	FNT	—	Lloyds	—	For emergency Signals	—	—	—
Felixstowe	[illegible]	[illegible]	—	[illegible]	—	O	—	—	—

Flannan Islands	58° 17' 00" N. 7° 3? 00" W.	FNL	—	Lloyds	—	Private ..	—	—	1.50
Folkestone Harbo ..	Straits of Dover 1° 11' 30" E. 51° 04' 30" N.	GUR	45	South Eastern and Chatham Railway	300, 600	P[100]	—	—	—
Grimsby	0° 04' 00" W. 53° 35' 00" N.	BYV	—	Admiralty ..	—	O	—	—	—
Guernsey	Channel Islands, Fort George 2° 32' 00" W. 49° 28' 00" N.	GU	—	Admiralty ..	—	O	—	—	—
Gull Lightship	Straits of Dover 1° 28' 00" E. 51° 16' 00" N.	GVC	15	Trinity House ..	230	Reception and transmission of distress signals	N	—[88]	—[88]
Harwich	Essex 1° 19' 30" E. 51° 56' 30" N.	BZW	—	Admiralty ..	—	O	—	—	—
Haven, The (Poole) ..	50° 40' 00" N. 1° 56' 00" W.	MHH	—	Marconi Co ..	—	—	—	—	—
Heysham Harbour ..	Irish Sea, Morecambe Bay 2° 55' 00" W. 54° 02' 00" N.	GHH	150	Midland Railway	400	P, restricted to the ships of the Midland Railway Company	N, during the crossing between Heysham and Belfast	—	—
Horsea	Near Portsmouth 1° 06' 00" W. 50° 50' 30" N.	BYC	—	Admiralty ..	—	O	—	—	—
Hunstanton	North Sea, The Wash 0° 30' 00" E. 52° 57' 00" N.	GHC	100	Post Office ..	300	—[96]	N	—	—
Inishtrahull	55° 25' 00" N. 7° 13' 00" W.	IH	—	Lloyds	—	For emergency signals	—	—	—
Ipswich	1° 09' 00" E. 52° 05' 00" N.	BYE	—	Admiralty ..	• —	O	—	—	—
Isle of Grain	Kent, Mouth of the Thames 0° 43' 00" E. 51° 26' 15" N.	BZY	—	Admiralty ..	—	O	—	—	—
Land's End	Cornwall 5° 40' 10" W. 50° 07' 00" N.	GLD	250	Post Office ..	300, 600	P G	N	0.60[92] 0.30[93] 0.15[94]	—[92] 1.80[93] 1.50[94]
Lerwick	Shetland Islands 1° 11' 00" W. 60° 09' 00" N.	BYU	—	Admiralty ..	—	O	—	—	—
Lochboisdale	Hebrides 7° 16' 00" W. 57° 08' 00" N.	GCB	150	Post Office ..	300	—[97]	8 a.m. to 8 p.m., week days only	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Malin Head	North Coast of Ireland 7° 22′ 00″ W. 55° 23′ 00″ N.	GMH	100	Post Office ..	300	P G	Greenwich time N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Newhaven..	0° 04′ 00″ E. 50° 48′ 00″ N.	GNV	120	London Brighton & S.C. Railway	400	— [98]	10 a.m. to 2 p.m., 8.30 p.m. to 11.30 p.m.	—	—
Niton	Isle of Wight 1° 18′ 00″ W. 50° 35′ 00″ N.	GNI	150	Post Office ..	300	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
North Foreland	North of Ramsgate 1° 26′ 00″ E. 51° 23′ 00″ N.	GNF	200	Post Office ..	300	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Parkeston Quay	Near Harwich 1° 15′ 00″ E. 51° 56′ 00″ N.	GPQ	130	Great Eastern Railway	**450**. 600 [99]	P restricted to the ships of the Great Eastern Railway Company	N, during the crossing of the ships	—	—
Pembroke	4° 58′ 00″ W. 51° 41′ 00″ N.	BYF	—	Admiralty ..	—	O	—	—	—
Poldhu	Cornwall 5° 16′ 00″ W. 50° 02′ 00″ N.	MPD	1,000	Marconi Co. ..	2,800	P R [104].. ..	11 p.m. to 2 a.m.	3.00	—
Porthcurno	50° 07′ 00″ N. 5° 33′ 00″ W.	—	—	Eastern Telegraph Co.	—	—	—	—	—
Portland Bill	English Channel Isle of Portland 2° 27′ 00″ W. 50° 32′ 00″ N.	BYN	—	Admiralty ..	—	O	—	—	—
Portpatrick	Scotland, North Channel 5° 09′ 00″ W. 54° 50′ 00″ N.	BYS	—	Admiralty ..	—	O	—	—	—
Portsmouth (Signal School)	1° 06′ 00″ W. 50° 48′ 00″ N.	BZC	—	Admiralty ..	—	O	—	—	—
Rame Head	Entrance to the Port of Plymouth	BYO	—	Admiralty ..	—	O	—	—	—

[illegible]	[illegible] 56° 01' 00" N.	[illegible]	—	Admiralty ..	—	O	—	—	—
Scarborough	0° 26' 00" W. 54° 16' 00" N.	BYI	—	Admiralty ..	—	O	—	—	—
Scilly Islands	6° 17' 00" W. 49° 56' 00" N.	BYP	—	Admiralty ..	—	O	—	—	—
Seaforth (Liverpool) ..	3° 01' 00" W. 53° 28' 00" N.	GLV	200	Post Office ..	300	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	—[12] 1.80 [93] 1.50 [94]
Sheerness	Mouth of the Thames 0° 45' 00" E. 51° 27' 00" N.	BYK	—	Admiralty ..	—	O	—	—	—
Skegness	North Sea, The Wash 0° 21' 00" E. 53° 09' 00" N.	GSN	100	Post Office ..	300	—[13]	N	—	—
South Goodwin Lightship	Straits of Dover 1° 28' 00" E. 51° 09' 00" N.	GVD	15	Trinity House ..	230	Reception and transmission of distress signals	N	—[95]	—[95]
Stockton	1° 21' 00" W. 54° 34' 00" N.	BYT	—	Admiralty ..	—	O	—	—	—
Sunk Lightship	South-West of Harwich 1° 30' 00" E. 51° 51' 00" N.	GVE	30	Trinity House ..	230	Reception and transmission of distress signals	N	—[95]	—[95]
Tobermory	Isle of Mull 6° 04' 00" W. 56° 36' 00" N.	GCA	150	Post Office ..	300	—[14]	8 a.m. to 8 p.m., week days only	—	—
Tongue Lightship ..	North of Margate 1° 23' 00" E. 51° 30' 00" N.	GVF	15	Trinity House ..	230	Reception and transmission of distress signals	N	—[95]	—[95]
Valencia Island	—	—	—	—	—	—	—	—	—
Whitehall (London) ..	0° 10' 00" W. 51° 30' 00" N.	BYA	—	Admiralty ..	—	O	—	—	—
Wick	North Coast of Scotland 3° 06' 00" W. 58° 26' 00" N.	BYG	—	Admiralty ..	—	O	—	—	—
Yarmouth..	Norfolk 1° 44' 15" E. 52° 34' 45" N.	BZX	—	Admiralty ..	—	O	—	—	—
GREECE									
Athens	23° 43' 13.8" E. 37° 58' 19.7" N.	SXA	—	Government ..	—	O	—	—	—
Salamis	Island of Salamis 23° 32' 00" E. 37° 58' 15" N.	SXL	—	Government ..	—	O	—	—	—

Land Stations—*Continuea*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
GREECE—*contd*	Meridian of Greenwich.						Greenwich time	Francs.	Francs.
Salonica	22° 59′ 00″ E. 40° 36′ 00″ N.	SXC	—	Government ..	—	O	—	—	—
Syra	Island of Syra 24° 56′ 33″ E. 37° 25′ 43″ N.	SXS	—	Government ..	—	O	—	—	—
Thasos	Island of Thasos 24° 43′ 30″ E. 40° 46′ 00″ N.	SXT	—	Government ..	—	O	—	—	—
HOLLAND									
Amsterdam	4° 54′ 39″ E. 52° 22′ 23″ N.	PCA	—	Government ..	—	O	—	—	—
Haaks Lightship	To the west of Helder 4° 18′ 08″ E. 52° 57′ 08″ N.	PCO	40	Government ..	**400**	Special[105] ..	X	—[106]	—[106]
Helder	4° 46′ 38″ E. 52° 57′ 44″ N	PCB	—	Government ..	—	O	—	—	—
Hellevoetsluis	4° 08′ 00″ E. 51° 49′ 30″ N.	PCC	—	Government ..	—	O	—	—	—
Noord-Hinder Lightship	North Sea 2° 37′ 00″ E. 51° 35′ 00″ N.	PCN	40	Government ..	**400**	Special[105] ..	X	—[106]	—[106]
Scheveningen-Port ..	North Sea coast.	PCH	1,200	Government ..	300, 500, **600**, 1,800	P G[107] ..	N	0.20	2.00
HONG KONG									
Tamar (Hong Kong) ..	114° 10′ 00″ E. 22° 17′ 00″ N.	BZA	—	—	—	O	—	—	—
INDIA. (*See British India, p.* 284.									
ITALIAN SOMALILAND									
Bardera	42° 16′ 15″ E.	ISN	200	Government ..	700–750	P G	Sunrise to sunset	0.30[108]	—[108]

Itala	3° 0?' 10" N. Bénadir 40° 19' 43" E. 2° 45' 27" N.	ISM	100	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Lugh	42° 36' 00" E. 3° 48' 00" N.	ISO	100	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Mahaddei Uen	45° 31' 01" E. 2° 58' 14" N.	ISF	160	Government ..	600	P R [111] ..	Sunrise to sunset	0.30 [108]	— [108]
Massawa (*see* ERITREA, p. 292)	—	—	—	—	—	—	—	—	—
Merca	Bénadir 44° 46' 22" E. 1° 42' 40" N.	ISB	160	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Mogadiscio, ISE	Bénadir 45° 21' 14.[5] E. 2° 02' 13.[5] N.	ISE	160	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [109]
Mogadiscio, ISG	Bénadir 45° 21' 14.[5]" E. 2° 02' 13.[5]" N.	ISG	1,600	Government ..	4,000	P G [110] ..	X	0.30	—
ITALY									
Bologna	11° 20' 00" E. 44° 30' 00" N.	IGB	—	Army	—	O	—	—	—
Brindisi	—	ICE	—	Government ..	—	—	—	—	—
Castellaccio (Genoa) ..	8° 56' 02" E. 44° 25' 44" N.	ICB	160	Government ..	600, 800	P G	N	0.30	—
Castel S. Elmo (Naples)	14° 15' 36.[5]" E. 40° 50' 14" N.	ICN	270	Government ..	600, 1,200	P G	N	0.30	—
Castiadas-Calasinzias (Cagliari)	Sardinia 9°33' 30" E. 39° 12' 30" N.	ICC	270	Government ..	600, 1, 00	P G	Sunrise to sunset	0.30	—
Coltano	43° 38' 00" N. 10° 24' 00" E.	ICI	—	Government ..	—	P G	—	—	—
Firenze	11° 10' 25" E. 43° 40' 36" N.	IGF	—	Army	—	O	—	—	—
Isola Chiesa	Strait of Bonifacio Maddalena Island 9° 25' 10" E. 41° 12' 50" N.	ICH	215	Government ..	600, 800	P G	N	0.30	—
Messina [109]	15° 37' 27" E. 38° 15' 00" N.	IFM	27	Government ..	50	O [8]	—	—	—
Milan	9° 10' 05" E. 45° 20' 40" N.	IGM	—	Army	—	O	—	—	—
Monte Cappuccini ..	Near Ancona 13° 30' 55" E. 43° 37' 31" N.	ICA	160	Government ..	600	P G	Sunrise to sunset	0.30	—

X

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
ITALY—*contd.*									
Punta Sperone	Meridian of Greenwich. Sardinia, Island of S. Antioco 8° 24′ 42″ E. 38° 57′ 59″ N.	ICR	270	Government ..	**600**, 1,000, 1,200	P G	Greenwich Time. N	Francs. 0.30	Francs. —
Reggio Calabria [109] ..	15° 38′ 30″ E. 38° 08′ 00″ N.	IFR	27	Government ..	50	O[8]	—	—	—
Roma	—	ICD	—	Government ..	—	—	—	—	—
S. Cataldo (Bari) ..	16° 52′ 00″ E. 41° 08′ 00″ N.	ICQ	160	Government ..	600	P G[112]	Central European Time. 8 a.m. to 12 p.m.	0.30	—
S. Maria di Leuca ..	Coast of the Ionian Sea 18° 20′ 43″ E. 39° 48′ 39″ N.	ICL	160	Government ..	600	P G	Greenwich Time. Sunrise to sunset	0.30	—
Sferracavallo (Palermo) ..	13° 16′ 40″ E. 38° 11′ 48″ N.	ICP	270	Government ..	600, **1,200**	P G	Sunrise to sunset	0.30	—
Spezia	41° 53′ 00″ N. 12° 22′ 00″ E.	ICS	—	Government ..	—	—	—	—	—
Taranto	17° 15′ 05″ E. 40° 28′ 05″ N.	ICT	270	Government ..	**600**, 1,100, 1,200	P G	N	0.30	—
Torino	7° 40′ 10″ E. 45° 00′ 20″ N.	IGT	—	Army	—	O	—	—	—
Treviso	12° 10′ 26″ E. 45° 30′ 53″ N.	IGV	—	Army	—	O	—	—	—
Venezia (Carbonera) ..	12° 21′ 15″ E. 45° 29′ 00″ N.	ICZ	450	Army	**600**, 1,800	O	Sunrise to sunset	—	
Viesti	Coast of the Adriatic Sea 16° 10′ 54″ E. 41° 52′ 48″ N.	ICM	160	Government ..	600	P G	Sunrise to sunset	0.30	—
Villa San Giovanni [109] ..	Calabria, Strait of Messina 15° 38′ 00″ E. 38° 10′ 00″ N.	IFV	27	Government ..	50	O[8]	—	—	—
[illegible]	[illegible]	ICV	[illegible]	Government ..	**600**, 1,000, [illegible]	P G	N	0.30	—

	140° 51′ 12″ E. 35° 44′ 08″ N.		… night, 1,500	…munications			..	0.00 …	—
Dairenwan	Peninsula of Kwan-tung 121° 53′ 15″ E. 38° 57′ 50″ N.	JDA	By day, 350 ; by night, 1,200	Ministry of Communications	300, 600	P G	N	0.60 [114]	—
Fukkikaku	Island of Formosa, Formosa Strait 121° 32′ 00″ E. 25° 18′ 00″ N.	JFK	By day, 400 ; by night, 1,200	Ministry of Communications	300, 600	P G	N	0.60 [114]	—
Osezaki	Kyushyu, Goto Islands 128° 37′ 08″ E. 32° 37′ 20″ N.	JOS	By day, 450 ; by night, 1,500	Ministry of Communications	300, 600	P G	N	0.60 [114]	—
Otchishi	Hokkaido, Pacific Coast 145° 30′ 20″ E. 43° 10′ 17″ N.	JOC	By day, 450 ; by night, 1,500	Ministry of Com munications	300, 600	P G	N	0.60 [114]	—
Shiomisaki	Hondo, Kii Channel 135° 46′ 08″ E. 33° 25′ 32″ N.	JSM	By day, 250 ; by night, 1,000	Ministry of Communications	300, 600	P G	N	0.60 [114]	—
Tsunoshima	Hondo, near Shimonoseki 130° 50′ 00″ E. 34° 21′ 00″ N.	JTS	By day, 200 ; by night, 800	Ministry of Communications	300, 600	P G	N	0.60 [114]	—
LIBERIA (REPUBLIC OF)									
Monrovia, FMA	10° 49′ 36″ W., Greenwich 13° 09′ 50″ W., Paris 6° 16′ 40″ N.	FMA	By day, 280 ; by night, 550	French Government	600	P G	Sunrise to sunset	—	—
Monrovia, KAB	10° 48′ 42″ W. 6° 18′ 26″ N.	KAB	By day, 320 ; by night, 650	Deutsch-Südamerikanische Telegraphengesellschaft, Cologne	600	P G	Greenwich time 7 a.m. to 9 a.m., 11 p.m. to 1 a.m.	—	—
MADAGASCAR									
Diégo-Suarez	North of Madagascar 49° 22′ 45″ E., Greenwich 47° 02′ 31″ E., Paris 12° 15′ 04″ S.	FDG	By day, 325 ; by night, 650	—	600	P G [115], O ..	Third time-belt east of Greenwich belt 7 a.m. to 11 a.m. 1.30 p.m. to 5.30 p.m.	0.50	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
MADAGASCAR—*cont.*	Meridian of Greenwich.							Francs.	Francs.
Dzaoudzi	Mayotta Island (Comoro Islands) 45° 16′ 2[illegible]″ E., Greenwich 42° 56′ 15″ E., Paris 12° 46′ 55″ S.	FDO	430	French Government	600	P G [116] ..	7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.60	—
Majunga	Mozambique Channel 46° 20′ 14″ E., Greenwich 44° 00′ 00″ E., Paris 15° 43′ 00″ S.	FJA	430	French Government	600	P G [117] ..	7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.60	—
MALTA									
Malta Island	14° 29′ 24″ E. 35° 55′ 17″ N.	VPT	200	Eastern Telegraph Co.	**300**, 600	P G	N [117a]	0.60	..
Malta (Rinella Bay) ..	14° 32′ 00″ E. 36° 53′ 00″ N.	BYZ	—	British Navy ..	—	O	—	—	—
Malta (S. Angelo) ..	14° 31′ 00″ E. 36° 53′ 00″ N.	BYY	—	British Navy ..	—	O	—	—	—
MEXICO	Time of the meridian of Tacubaya.						Time of the meridian of Tacubaya [121]		
Campeche [120]	90° 34′ 36″ W., Greenwich 8° 35′ 24″ E., Tacubaya 19° 51′ 40″ N.	XAB	300	—	600, 750, **900**, 1,180	P G [119] ..	8 a.m. to 10 p.m.	0.30	3.00
Guaymas [120]	Sonora 110° 58′ 00″ W., Greenwich 11° 48′ 00″ W., Tacubaya 27° 55′ 30″ N.	XAH	300	—	600, 750, **900**, 1,180	P G	8 a.m. to 7 p.m.	0.30	3.00
Isla Maria Madre	106° [illegible] W.,	XAD	300	—	600, 750, **900**, 1,180	P G [119] ..	8 a.m. to 7 p.m.	0.30	3.00

Payo Obispo [120]	7° 19′ 00″ W., Tacubaya 23° 16′ 00″ N. Quintana Roo 88° 25′ 00″ W., Greenwich 10° 45′ 00″ W., Tacubaya 18° 33′ 00″ N.	XAC	300	—	600, 750, 900, 1,180	P G	8 a.m. to 10 p.m.	0.30	3.00
S. José del Cabo	South coast of Lower California 109° 42′ 00″ W., Greenwich 10° 32′ 00″ W., Tacubaya 23° 03′ 00″ N.	XAF	180	—	600, 900	P G [118] ..	8 a.m. to 7 p.m.	0.30	3.00
S. Rosalia de la Baja, California	Lower California 112° 20′ 00″ W., Greenwich 13° 10′ 00″ W., Tacubaya 27° 24′ 00″ N.	XAG	80	—	600	P G [118] ..	8 a.m. to 7 p.m.	0.30	3.00
Veracruz de Veracruz [120]	96° 07′ 16″ W., Greenwich 3° 02′ 44″ E., Tacubaya 19° 10′ 50″ N.	XAA	300	—	600, 750, 900, 1,180	P G [119] ..	8 a.m. t 10 p.m.	0.30	3.00
MONTENEGRO									
Antivari	Meridian of Greenwich 42° 08′ 00″ N. 19° 07′ 00″ E.	—	—	Compagnia di Antivari	—	—	—	—	—
MOROCCO									
Cas blanca	7° 37′ 00″ W., Greenwich 9° 57′ 00″ W., Paris 33° 36′ 30″ N.	CNP	430	—	600	P G	Greenwich time 6 a.m. to 12 p.m.	0.25	—
Mogador	9° 46′ 00″ W., Greenwich 12° 06′ 00″ W., Paris 31° 31′ 00″ N.	CNY	430	—	600	P G	6 a.m. to 12 p.m.	0.25	—
Rabat	6° 50′ 30″ W., Greenwich 9° 10′ 30″ W., Paris 34° 02′ 15″ N.	CNF	110	—	450	O	6 a.m. to 7 a.m., 6 p.m. to 7 p.m.	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
MOROCCO—*contd.*									
Tangier	Meridian of Greenwich. 5° 49′ 00″ W., Greenwich 8° 09′ 00″ W., Paris 35° 47′ 15″ N.	CNW	430	—	600	P G	Greenwich time. 6 a.m. to 12 p.m.	Francs. 0.25	Francs. —
NEW ZEALAND									
Auckland Radio	174° 46′ 08.33″ E. 36° 50′ 36.78″ S.	VLD	325	Government ..	300, **600**	P G	Mean time of New Zealand[133] Summer: 4 a.m. to 8 a.m., 9 a.m. to 11 a.m., 1 p.m. to 6 p.m. 7 p.m. to 9 p.m. Winter: 6 a.m. to 8 a.m., 9 a.m. to 11 a.m., 1 p.m. to 6 p.m., 7 p.m. to 8 p.m.	0.60[133]	—[130]
Awanui	—	VLA	By day, 1,200; by night, 2,500	Government	—	—	—	—	—
Bluff	—	VLB	—	Government	—	—	—	—	—
Chatham Islands ..	176° 57′ 00″ W. 43° 57′ 00″ S.	VLC	By day, 1,200; by night, 2,500 300	Government	600	P G	9 a.m. to 1 p.m., 3 p.m. to 5 p.m., 7 p.m. to 12 p.m.	0.60[134]	[134]
Wellington Radio ..	174° 46′ 39″ E. 41° 17′ 05″ S.	VLW	325	Government	300, **600**	P G	N	0.60[133]	—[133]
NORWAY									
Bergen Radio	North Sea coast 5° 22′ 00″ E. 60° 24′ 30″ N.	LGN	By day, 270; by night, 800	—	600	P G	Central European time N	0.14	1.40
Flekkerö	Skager Rak, near [illegible]	LDF	By day, 260; by [illegible]	—	600	P G	N[136]	0.14	1.40

	24° 09' 20" E. 71° 04' 25" N.								
Karljohansvern	Lofoden Islands 12° 04' 45" E. 67° 30' 24" N.	LFR	35	—	600	P G [131] ..	9 a.m. to 1 p.m., 4 p.m. to 7.30 p.m. Holidays: 8 a.m. to 10 a.m.	0.14	1.40
Röst	Christiania Fiord	LBZ	—	—	—	O	—	—	—
Sörvaagen	Lofoden Islands 13° 02' 00" E. 67° 53' 30" N.	LEN	35	—	600	P G [131] ..	9 a.m. to 1 p.m., 4 p.m. to 7.30 p.m. Holidays: 8 a.m. to 10 a.m.	0.14	1.40
Spitsbergen	Green Harbour 14° 14' 27" E. 78° 02' 26" N.	LFG	480	—	600	P G	N,[129] 8 a.m. to 9 p.m.[130]	0.20	2.00
Stavanger [135]	—	—	—	—	—	—	—	—	—
Tjömö	Christiania Fiord 10° 24' 05" E. 59° 03' 05" N.	LET	By day, 160; by night, 50	—	600	P G	N [130]	0.14	1.40
PORTUGAL									
Corvo	Azores 31° 07' 35" W. 39° 40' 10" N.	CRB	65	Government ..	300, 600	P G [132] ..	N	0.60	—
Faial	Azores 28° 44' 10" W. 38° 38' 00" N.	CRC	130	Government ..	300, 600	P G [132] ..	N	0.60	—
Flores	Azores 31° 08' 10" W. 39° 27' 35" N.	CRD	130	Government ..	300, 600	P G [132] ..	N	0.60	
Lisbon	9° 08' 20" W. 38° 42' 18" N.	CRF	190	Government ..	300, 450, 600	P G	N	0.40	—
Madeira Island	—	—	—	Government ..	—	—	—	—	—
Oporto	—	—	—	Government ..	—	—	—	—	—
Santa Maria	Azores 25° 08' 20" W. 36° 59' 55" N.	CRB	65	Government ..	300, 600	P G [132] ..	N	0.60	—
Sao Miguel	Azores 25° 42' 50" W. 37° 44' 30" N.	CRA	65	Government ..	300, 600	P G [132] ..	N	0.60	—
St. Vincent Island ..	—	—	—	Government ..	—	—	—	—	—
ROUMANIA									
Constantza-Tunnel ..	28° 39' 03" E., Greenwich 26° 19' 10" E., Paris 44° 10' 32" N.	CVS	240	State Maritime Service	600	P R [133] ..	N, during the voyages of the Roumanian ships	— [134]	— [134]

Land Stations—*Continued*

Name	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
RUSSIA	Meridian of Greenwich.						Time of St. Petersburg, 2 hours in advance of Greenwich time	Francs.	Francs.
Anadyr	Behring Sea 175° 35′ 00″ E. 64° 34′ 00″ N.	RNR	130	—	300, 420, **600**	P G	11 a.m. to 7 p.m.	0.60	—
Arkhangel	Mouth of the Dwina 40° 30′ 00″ E. 64° 32′ 00″ N.	RQA	250	—	300, 420, **600**	P G	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 12 p.m.	0.60 [120]	—[120]
Batoum	Black Sea 41° 40′ 00″ E. 41° 36′ 00″ N.	REI	—	—	—	O	—	—	—
Fort d'Alexandrovsk ..	Coast of the Caspian Sea 50° 16′ 40″ E. 44° 30′ 14″ N.	RNF	160	—	300, 420, **600**	P G	5.50 a.m. to 9.50 a.m., 11.50 a.m. to 3.50 p.m.	0.60	—
Hapsal	Esthonia 23° 48′ 00″ E. 59° 00′ 00″ N.	REC	—	—	—	O	—	—	—
Helsingfors	24° 57′ 00″ E. 60° 27′ 00″ N.	REB	—	—	360	O	—	—	—
Kerbinskaia	River Amgoun, a tributary of the Amur 136° 34′ 40″ E. 52° 10′ 00″ N.	RPN	170	—	—	—[125]	X	—	—
Kerch	Crimea 36° 27′ 00″ E. 45° 18′ 00″ N.	REH	—	—	—	O	—	—	—
Kronstadt	29° 47′ 00″ E. 59° 59′ 00″ N.	REA	—	—	360	O	—	—	—
Libau, RED	21° 05′ 00″ E. 56° 30′ 00″ N.	RED	—	—	360	O	—	—	—
Libau, ROL	Baltic Sea 20° 50′ 00″ E. 56° 31′ 40″ N.	ROL	170	—	300, 420, **600**	P G	6 a.m. to 10 p.m.	0.60	—
[illegible]	Sea of Okhotsk 140° 30′ 00″ E.	RNN	130	—	300, 420, **600**	P G	11 a.m. to 7 p.m.	0.60	—

Odessa	53° 08′ 19.″ N.	RAR	—	—	—	O	—	—	—
Okhotsk	Sea of Okhotsk 143° 20′ 00″ E. 59° 22′ 00″ N.	ROT	130	—	300, 420, 600	P G	5 a.m. to 9 p.m.	0.60	—
Pétropavlovsk	Kamtchatka 158° 38′ 45″ E. 53° 00′ 10″ N.	RPK	240	—	300, 600	P G	N	0.60	—
Pétrowsk Dagbestan ..	Coast of the Caspian Sea 47° 30′ 00″ E. 42° 59′ 20″ N.	ROK	160	—	300, 420, 600	P G	5.50 a.m. to 9.50 a.m., 11.50 a.m. to 3.50 p.m.	0.60	—
Presté	Aland Islands 20° 21′ 00″ E. 60° 16′ 00″ N.	REF	—	—	360	O	—	—	—
Rade d'Astrakhan ..	Caspian Sea 47° 25′ 00″ E. 45° 15′ 00″ N.	RQT	110	—	300, 420, 600	P G	5.50 a.m. to 9.50 a.m., 11.50 a.m. to 3.50 p.m.[138]	0.13	—
Rade de Taganrog ..	Sea of Azov 38° 14′ 10″ E. 46° 59′ 50″ N.	ROE	110	—	300, 420, 600	P G[140] ..	6 a.m. to 10 p.m.	0.60[139] [140]	[139] [140]
Reval	24° 15′ 00″ E. 59° 20′ 00″ N.	ROR	170	—	300, 420, 600	P G	6 a.m. to 10 p.m.	0.60	—
Riga[134]	24° 06′ 15″ E. 56° 59′ 53″ N.	RRG	160	—	300, 420, 600	P G	6 a.m. to 10 p.m.	0.60	—
Rouno	Gulf of Riga 23° 15′ 40″ E. 57° 48′ 00″ N.	RRN	70	—	300, 420, 600	P G	8 a.m. to 12 a.m., 2 p.m. to 5 p.m., 8 p.m. to 9 p.m.	0.60	—
Sébastopol	33° 33′ 00″ E. 44° 37′ 00″ N.	REG	—	—	360	O	—	—	—
Taganrog	Sea of Azov 38° 48′ 00″ E. 47° 12′ 00″ N.	RRT	170	—	300, 420, 600	P G[140] ..	6 a.m. to 10 p.m.	0.60[139] [140]	—[139] [140]
Vladivostok, RAS ..	131° 54′ 00″ E. 43° 06′ 00″ N.	RAS	—	—	1,200 approximately	O	—	—	—
Vladivostok, REJ ..	131° 53′ 22.5″ E. 43° 06′ 49.2″ N.	REJ	—	—	360	O	—	—	—
Wiborg	28° 49′ 00″ E. 61° 00′ 00″ N.	RAW	—	—	1,200 approximately	O	—	—	—
SIERRA LEONE									
Sierra Leone	13° 14′ 00″ W. 8° 30′ 00″ N.	VPU	250	—	300, 600	P G	Greenwich time 7 a.m. to 9 p.m. Sundays: 8 a.m. to 10 a.m., 4 p.m. to 6 p.m.	0.60	—
SOUTH AFRICA (UNION OF)									
Capetown[141]	18° 19′ 00″ E. 34° 09′ 00″ S.	VNC	350	Government ..	300, 600	P G	N	0.60	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
SOUTH AFRICA (UNION OF)—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Durban [141]	31° 03′ 50″ E. 29° 52′ 40″ S.	VND	250	Government ..	300, **600**	P G	N	0.60	—
Pretoria	—	—	—	—	—	—	—	—	—
SPAIN									
(a) Mother-Country									
Almeria	2° 31′ 15″ W. 36° 51′ 00″ N.	EGA	220	Army	600, **900**	O	N	—	—
Aranjuez	3° 40′ 32″ W. 40° 01′ 48″ N.	EAA	430	Compania Nacional de T.S.H.	300, **600**, 2,130	P G	N	0.45	4.50
Barcelona, EAB (Prat de Llobregat)	2° 06′ 28″ E. 41° 18′ 42″ N.	EAB	430	Compania Nacional de T.S.H.	300, **600**, 2,300	P G	N	0.45	4.50
Barcelona, EGE	2° 03′ 52″ E. 41° 23′ 08″ N.	EGE	430	Army	600, 1,000, 1,600	O	N	—	—
Bilbao [143]	2° 55′ 34″ W. 43° 23′ 53″ N.	EGH	320	Army	600, 1,200, 1,600	O	N	—	—
Cabo de Palos	0′ 40′ 00″ E. 37° 38′ 00″ N.	EAP	—	Compania Nacional de T.S.H.	—	P G	—	—	—
Cabo Mayor	Santander 3° 48′ 30″ W. 43° 30′ 00″ N.	EAS	108	Compania Nacional de T.S.H.	300, **600**, 1,800	P G	N	0.45	4.50
Càdiz	6° 17′ 42″ W. 36° 31′ 30″ N.	—	6	—	70	P [143]	—	—	—
Càdiz, EAC	6° 16′ 14″ W. 36° 29′ 45″ N.	EAC	860	Compania Nacional de T.S.H.	300, **600**, 2,540	P G	N	0.45	4.50
Coruña [142]	8° 24′ 13″ W. 43° 24′ 29″ N.	EGJ	430	Army	600, 1,200, 1,600	O	N	—	—
Finisterre	9° 13′ 00″ E. 42′ 52′ 00″ N.	EAF	—	Compania Nacional de T.S.H.	—	P G	—	—	—
Guadalajara	3° 10′ 09″ W. 40° 37′ 54″ N.	EGZ	54	Army	900	O	X	—	—
Huelva	—	—	—	Compania Nacional de T.S.H.	—	—	—	—	—
Madrid, EBZ [144]	3° 43′ 00″ W. 40° 25′ 00″ N.	EBZ	15	Navy	225, 300	O	N	—	—
Madrid, EGC	3° [illegible] W. [illegible] N.	EGC	540	Army	600, 900, 1,600, 2,000, 2,500	O	N	—	—
[illegible]	[illegible] W.	EAA	[illegible]	Compania Nacional [illegible]	[illegible], **600**, [illegible]	P G	N	0.45	4.50

	39° 52′ 29″ N.								
Malaga	—	—	—	Compania Nacional de T.S.H.	—	P G	—	—	—
Matagorda	Gulf of Cadiz 6° 14′ 54″ W. 36° 31′ 30″ N.	—	6	Compagnie transatlantique espagnole	70	P[166]	—	—	—
Palmas (Las)	15° 22′ 10″ W. 28° 00′ 00″ N.	EAL	860	Compania Nacional de T.S.H.	300, 600, 2,540	P G	N	0.45	4.50
San Fernando (Càdiz) ..	—	EBY	—	—	—	O	N	—	—
Santander	—	EAS	600	—	600, 1,800	P G	N	0.45	4.50
Sóller[165]	Majorca 2° 45′ 40″ E. 39° 45′ 15″ N.	EAO	270	Compania Nacional de T.S.H.	300, 600	P G	N	0.45	4.50
Teneriffe	16° 15′ 00″ W. 28° 28′ 30″ N.	EAT	860	Compania Nacional de T.S.H.	300, 600, 2,540	P G	N	0.45	4.50
Valencia[166]	0° 22′ 46″ W. 39° 27′ 10″ N.	EGG	320	Army	600, 1,200, 1,600	O	N	—	—
Valentia	—	—	—	Compania Nacional de T.S.H.	—	P G	—	—	—
Vigo (Pontevedra) ..	8° 40′ 00″ W. 42° 15′ 00″ N.	EAV	430	Compania Nacional de T.S.F.	300, 600, 2,900	P G	N	0.45	4.50
(b) Morocco									
Ceuta	5° 16′ 24″ W. 35° 48′ 40″ N.	EGD	320	Army	600, 1,200, 1,500	O	N	—	—
Larache	6° 12′ 00″ W. 35° 12′ 00″ N.	EGF	220	Army	600, 900, 1,200	O	N	—	—
Melilla	2° 56′ 25″ W. 35° 18′ 15″ N.	EGB	320	Army	600, 1,200, 1,600	O	N	—	—
Melilla	—	—	—	Compania Nacional de T.S.H.	—	—	—	—	—
(c) In the Gulf of Guinea.									
Santa Isabel de Fernando Póo	8° 48′ 40″ E. 3° 46′ 00″ N.	EAY	130	Government ..	600, 750, 900	P G[166]	N	0.55[167]	5.50[167]
SWEDEN							Central European time		
Gothenburg (Göteborg) ...	11° [illegible]3′ 46″ E. 57° 41′ 5″ N.	SAB	350	Government ..	300, 600	P G	7 a.m. to 9 p.m.	0.14	1.40
Karlskrona	15° 35′ 30″ [illegible] 56° 09′ 10″ N.	SAA	420	Marine Dept. ..	600	P G	8 a.m. to 8 p.m.	0.14	1.40
Oscar-Fredriksborg ..	Near Stockholm 18° 26′ 42″ E. 59° 23′ 48″ N.	SAD	50	Marine Dept. ..	600	P G	—	0.14	1.40
Tingstäde	Gothland 18° 35′ 30″ E. 57° 43′ 50″ N.	SAE	420	Marine Dept. ..	600	P G	—	0.14	1.40
Trälleborg..	13° 09′ 45″ E. 55° 22′ 10″ N.	SAC	250	State Railways ..	300, 450, 600	P R,[169] O[169] ..	N	0.14	1.40

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
TUNIS								Francs.	Francs.
Bizerte	Meridian of Greenwich. In Sidi Abdallah 9° 49' 00" E. Greenwich 7° 29' 00" E. Paris 37° 16' 00" N.	FUA	—	French Navy ..	—	O	Central European time 9 a.m. to 12 p.m.	—	—
Cap Bon	11° 02' 23" E. Greenwich 8° 42' 23" E., Paris 37° 04' 48" N.	FFT	100	French Navy ..	**300**, 600 [151]	P G	7 a.m. to 10 p.m.	0.40 [158]	— [158]
TURKEY									
Constantinople (Ok Meiddan)	—	—	—	—	—	—	—	—	—
UNITED STATES OF AMERICA									
Annapolis, Maryland ..	Chesapeake Bay 76° 29' 12" W. 38° 59' 00" N.	NAK	100	U.S. Navy ..	600	O	Time of the meridian 75° west of Greenwich: 8 a.m. to 10 p.m.	—	—
Arlington, Virginia [157] ..	Near Washington, D.C. 77° 04' 47.30" W. 38° 52' 05.30" N.	NAA	1,000	U.S. Navy ..	2,500	O	N	—	—
Ashtabula	Ohio	WSA	—	Marconi Co. ..	—	—	—	—	—
Astoria, Oregon	124° 00' 00" W. 46° 10' 00" N.	KPC	300	Marconi Co. [159] ..	300, **600**	P G	N	0.30 [158] 0.60 [158]	3.00 6.00
Atlantic City, N.J. ..	New Jersey	WAX	—	Marconi Co. ..	—	—	—	—	—
Avalon	California	KPI	—	Marconi Co. ..	300, **600**	P R	7 a.m. to 8 p.m.	0.30	3.00
Baltimore, Maryland ..	76° 36' 41" W. 39° 17' 22" N.	WBS	150	Marconi Co. ..	300, **600**	P G	N	— [161]	—
Beaufort, North Carolina	76° 40' 21" W. 34° 43' 12" N.	NAN	100	U.S. Navy ..	300, **600**	P R [160, 161] ..	N	—	—
Benton Harbour	Michigan	WBN	—	Graham & Morton Tr. Co.	—	—	—	—	—

Boston, Mass.	42° 22′ 24″ N. Massachusetts 71° 03′ 40″ W. 42° 21′ 19″ N.	WBF	175	Marconi Co. ..	300, **600**	P G ..	..	N	0.30 [158] 0.60 [159]	3.00 6.00
Bremerton	Washington, Puget Sound 122° 38′ 19″ W. 47° 33′ 47″ N.	NPC	200	U.S. Navy ..	600	O ..	..	N	—	—
Brooklyn	New York	WCG	—	National Electric Signalling Co.	—	—		—	—	—
Buffalo	New York	WBL	—	Marconi Co. ..	—	—		—	—	—
Calumet	Michigan	WCM	—	Marconi Co. ..	—	—		—	—	—
Cape Blanco	Oregon 124° 33′ 30″ W. 42° 50′ 22″ N.	NPF	100	U.S. Navy ..	300, **600**	P G [160]	..	N	0.40	4.00
Cape Cod	Massachusetts 70° 03′ 54″ W. 42° 02′ 22″ N.	NAE	100	U.S. Navy ..	300, **600**	P R [160, 161]	..	N	— [161]	— [161]
Cape Cod (*see* South Wellfleet)	—	—	—	—	—	—		—	—	—
Cape Hatteras	Buxton, N.C. 75° 31′ 21″ W. 35° 15′ 58″ N.	WHA	300	Marconi Co. ..	300, **600**	P G ..	..	N	0.30	3.00
Cape May	New Jersey entrance to Delaware Bay 74° 55′ 46″ W. 38° 55′ 50″ N.	WCY	250	Marconi Co. ..	300, **600**	P G ..	..	N	0.30 [158] 0.60 [159]	3.00 6.00
Charleston, South Carolina [162]	79° 57′ 42″ W. 32° 51′ 38″ N.	NAO	200	U.S.Navy ..	300, **600**, 1,000, 1,800	P G O [161]	..	N	0.30	3.00
Chicago	Illinois 87° 37′ 30″ W. 41° 52′ 30″ N.	WGO	125	Marconi Co. ..	300, **600**	P G ..	..	Time of the meridian 90° west of Greenwich, April 15th to December 15th [163] : 12.30 a.m. to 7 a.m., 8 a.m. to 11.30 a.m., 12.30 p.m. to 7 p.m., 8 p.m. to 11.30 p.m.	0.30	3.00
Cleveland, Ohio	81° 41′ 13″ W. 41° 29′ 59″ N.	WCX	175	Marconi Co. ..	300, **600**	P G ..	..	N [163]	0.30	3.00
Daley City	California	KHP	—	Marconi Co. ..	—					
Detroit, Mich.	—	WDR	—	Marconi Co. ..	—	—		—	—	—
Diamond Shoals Lightship [164]	Off Cape Hatteras 75° 18′ 38″ W. 35° 05′ 08″ N.	NLB	60	U.S. Navy ..	300, **600**	P R [165] ..	..	Time of the meridian 75° west of Greenwich: 8 a.m. to 10 p.m. [166]		
Douglas, Ariz.	—	KDC	—	Copper Queen Consolidated Mining Co.	300, **600**,	P ..	..	10 a.m. to 11 a.m., 4 p.m. to 5 p.m.	—	—
Duluth, Minnesota ..	92° 07′ 10″ W. 46° 47′ 06″ N.	WDM	190	Marconi Co. ..	300, **600**	P G ..	..	— [166]	0.30	3.00

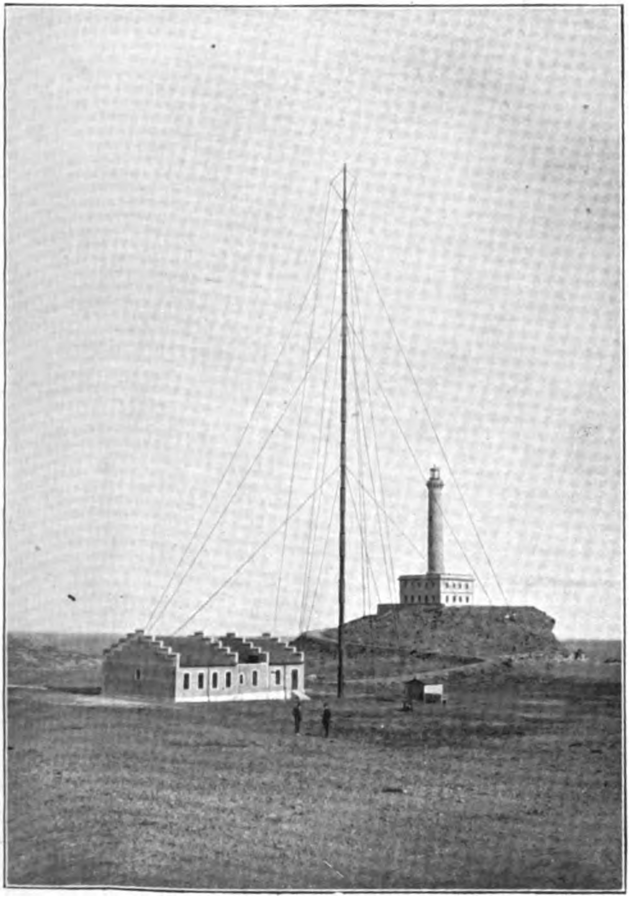
Land Stations—*Continued.*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Eureka, Cal.	—	KPM	—	Marconi Co. ..	—	—	—	—	—
Eureka, California [166] ..	Table Bluff 124° 16′ 22″ W. 40° 41′ 44″ N.	NPW	200	U.S. Navy ..	300, **600**, 1,000, 1,800	P G	N	0.40	4.00
Farallons	California to the west of S. Francisco 123° 00′ 04″ W. 37° 41′ 58″ N.	NPI	100	U.S. Navy ..	300, **600**	P R [166]	N	—	—
Fire Island	New York, south coast of Long Island 73° 13′ 08″ W. 40° 37′ 57″ N.	NAG	100	U.S. Navy ..	300, **600**	P R [166]	N	—	—
Fort Andrews	Massachusetts	WUA	—	U.S. Army ..	—	O			—
Fort Hancock, New Jersey	—	WUB	—	U.S. Army ..	—	O		—	—
Fort H. G. Wright ..	New York	WUC	—	U.S. Army ..	—	O	—	—	—
Fort Leavenworth, WUD	Kansas 94° 55′ 31″ W. 39° 21′ 00″ N.	WUD	—	U.S. Army ..	—	O	—	—	—
Fort Leavenworth, WUV [169]	Kansas	WUV	—	U.S. Army ..	—	O	—	—	—
Fort Levett	Maine	WUE	—	U.S. Army ..	—	O	—	—	—
Fort Monroe, WUF ..	Virginia	WUF	—	U.S. Army ..	—	O	—	—	—
Fort Monroe, WUG [170] ..	Virginia	WUG	—	U.S. Army ..	—	O	—	—	—
Fort Morgan (Alabama)..	—	WFM	—	Marconi Co. ..	—	— ..	—	—	—
Fort Omaha	Nebraska 95° 57′ 35″ W. 41° 18′ 50″ N.	WUH	—	U.S. Army ..	—	O	—	—	—
Fort Riley, Kansas ..	96° 47′ 01″ W. 39° 04′ 35″ N.	WUI	—	U.S. Army ..	—	O	—	—	—
Fort Sam Houston ..	Texas 98° 27′ 31″ W. 29° 27′ 04″ N.	WUJ	—	U.S. Army ..	—	O	—	—	—
Fort Stevens	Oregon	WUK	—	U.S. Army ..	—	O	—	—	—
Fort Totten	New York	WUL	—	U.S. Army ..	—	O	—	—	—

	... 32° 42′ 33″ N.			... Co.	3,000, 3,500		90° west of Greenwich: 6 a.m. to 6 p.m.		
Frankfort, Mich. ..	—	WFK	—	Ann Arbor R.R. Co.	—	P G	—	—	—
Friday Harbour	Washington, Washington Sound 123° 00′ 00″ W. 48° 30′ 00″ N.	KPD	200	Marconi Co. ..	300, 600	P G	Time of the meridian 120° west of Greenwich: 7 a.m. to 2.30 p.m.	0.30 [186] 0.60	3.00 6.00
Frying Pan Shoals Lightship [172]	North Carolina, off Cape Fear 77° 48′ 20″ W. 33° 33′ 30″ N.	NLC	60	U.S. Navy ..	300, 600	P R [165]	Time of the meridian 75° west of Greenwich: 8 a.m. to 10 p.m. [166]	—	—
Galveston, Tex.	—	WGV	—	Marconi Co. ..	—	—	—	—	—
Grand Haven, Mich. ..	—	WGH	—	Marconi Co. ..	—	—	—	—	—
Grand Island, La. ..	—	WGW	—	Marconi Co. ..	—	—	—	—	—
Grand Marais, Minn. ..	—	WGM	—	Marconi Co. ..	—	—	—	—	—
Hollister (Cal.) ..	—	KGH	—	Geo. Hewett ..	300, 600, 1,700	PR	X	—	—
Isle Royal, Minn. ..	—	WRO	—	Marconi Co. ..	—	—	—	—	—
Jacksonville, Florida ..	Mouth of S. John's River 81° 38′ 56″ W. 30° 18′ 25″ N.	WJX	200	Marconi Co. ..	300, 600	P G	N	0.30	3.00
Jupiter	East coast of Florida 80° 04′ 55″ W. 26° 56′ 52″ N.	NAQ	200	U.S. Navy ..	300, 600, 1,800	P G [180] ..	N	0.30	3.00
Key West, Florida [162] ..	81° 48′ 26″ W. 24° 33′ 28″ N.	NAR	400	U.S. Navy ..	300, 600, 1,000, 1,800	P G	N	0.60	6.00
Los Angeles, California ..	118° 15′ 00″ W. 34° 03′ 00″ N.	KEX	200	Marconi Co. ..	300, 600	P [184]	X	—	—
Ludington, Michigan ..	86° 26′ 19″ W. 43° 56′ 47″ N.	WLD	125	Marconi Co. ..	300, 600	P G	Time of the meridian 90° west of Greenwich: April 15th to Dec. 15th, [143] 7 a.m. to 6 p.m., 7 p.m. to 6 a.m.	0.30	3.00
Mackinac Island, Mich. ..	—	WHQ	—	Ann Arbor R.R. Co.	—	—	—	—	—
Manistique, Mich. ..	—	WMX	—	Ann Arbor R.R. Co.	—	—	—	—	—
Manitowoc	Wisconsin 87° 39′ 17″ W. 44° 05′ 18″ N.	WMW	150	Marconi Co. ..	300, 600	P G	Time of the meridian 90° west of Greenwich: 8 a.m. to 11.30 a.m., 2.30 p.m. to 6 p.m., 7.30 p.m. to 9 p.m.	0.30	3.00
Mare Island [168]	California 122° 15′ 56″ W. 38° 05′ 03″ N.	NPH	200	U.S. Navy ..	600, 1,000	O	N	—	—

Land Stations—*Continued.*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*								Francs.	Francs.
Marshfield, Ore.	Meridian of Greenwich. 124° 12′ 50″ W. 43° 22′ 26″ N.	KPX	150	Marconi Co. ..	300, **600**	P G	Time of the meridian 120° west of Greenwich: 8 a.m. to 6 p.m.	0.30 [158] 0.60 [159]	3.00 6.00
Milwaukee	Wisconsin 87° 55′ 27″ W. 43° 02′ 49″ N.	WME	150	Marconi Co. ..	300, **600**	P G	Time of the meridian 90° west of Greenwich: 1.30 a.m. to 6 a.m., 7 a.m. to 12.30 p.m., 1.30 p.m. to 6 p.m., 7 p.m. to 12.30 a.m.	0.30	3.00
Mobile (Alabama) ..	—	WMB	—	Marconi Co. ..	—	—	—	—	—
Nantucket Shoals Lightship [178]	To the east of Newport, R.I., south end of shoals 69° 36′ 33″ W. 40° 37′ 05″ N.	NLA	60	U.S. Navy ..	300, **600**	P R [166]	Time of the meridian 75° west of Greenwich: 8 a.m. to 10 p.m. [156]	—	—
New London, Conn. ..	—	WLC	—	T. A. Scott Co. ..	—	—	—	—	—
New Orleans [162]	Louisiana, Algiers 90° 02′ 18″ W. 29° 56′ 50″ N.	NAT	100	U.S. Navy ..	600, 1,000	P R [160, 161] ..	Time of the meridian 90° west of Greenwich: 8 a.m. to 10 p.m. [166]	—	—
New Orleans, La. ..	—	WHK	—	Marconi Co. ..	—	—	—	—	—
Newton, Mass.	—	WLN	—	R. C. Emery ..	—	—	—	—	—
Newport, Rhode Island [168]	71° 19′ 44″ W 41° 29′ 17″ N.	NAF	200	U.S. Navy ..	600, 1,000	P R, [160] O ..	N	—	—
New York..	—	WHI	—	Marconi Co. ..	—	—	—	—	—
New York, NAH [169] ..	Brooklyn 73° 58′ 51″ W. 40° 41′ 58″ N.	NAH	150	U.S. Navy ..	600, 1,000	O	N	—	—
New York, WHB ..	74° 00′ 50″ W. 40° 42′ 02″ N.	WHB	300	New York Herald Co.	300, **600**, 1,610	P G [174] ..	N	0.60	6.00
New York, WNT ..	74° 00′ 00″ W. 40° 42′ [illegible] N.	WNT	350	Atlantic Communication Co.	300, **600**, 1,800 [174]	P G	N	0.30 [158] 0.60 [159]	3.00 6.00
Norfolk, Virginia [169]	[illegible]	NAM	[illegible]	U.S. Navy ..	600, 1,000	O	N	—	—



Cape Palos Station (Spain).

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	124° 04′ 34″ W. 46° 17′ 42″ N.								
Paso, Texas (El)	106° 29′ 00″ W. 31° 48′ 06″ N.	WEP	—	Federal Telegraph Co.	2,000, 2,500, 2,900, 3,500	—[186]	Time of the meridian 90° west of Greenwich: 4 a.m. to 7 p.m.	—	—
Paso, Texas (El)	—	WEP	—	Federal Telegraph Co.	2,000, 2,500 2,900, 3,500	P R	6 a.m. to 7 p.m. ..	—	—
Pensacola, Florida ..	Florida, Gulf of Mexico 87° 16′ 13″ W. 30° 20′ 54″ N.	NAS	100	U.S. Navy ..	300, 600, 1,800	P G[160] ..	N	0.30	3.00
Philadelphia, NAI ..	Pennsylvania 75° 10′ 46″ W. 39° 53′ 18″ N.	NAI	150	U.S. Navy ..	600	O	N ..	—	—
Philadelphia, WHE[187] ..	Pennsylvania 75° 09′ 44″ W. 39° 57′ 06″ N.	WHE	250	Marconi Co. ..	300, 600, 1,610[176]	P G	N	0.30[188] 0.60[189]	3.00 6.00
Phœnix, Ariz.	—	KHQ	—	Federal Telegraph Co.	—	—	-	—	—
Point Arguello	California 120° 38′ 48″ W. 34° 34′ 35″ N.	NPK	100	U.S. Navy ..	300, 600	P G[160] ..	N	0.40	4.00
Point Judith	Rhode Island 71° 29′ 42″ W. 41° 22′ 06″ N.	WPJ	150	Marconi Co. ..	300, 600	P G	Time of the meridian 75° west of Greenwich: 8 a.m. to 6 p.m.	0.30	3.00
Port Arthur, Texas ..	—	WRU	—	Marconi Co. ..	—	—	—	—	—
Portland, Maine	70° 12′ 03″ W. 43° 33′ 42″ N.	NAB	100	U.S. Navy ..	300, 600	P R[160, 161] ..	Time of the meridian 75° west of Greenwich: 8 a.m. to 10 p.m.[164]	—	—
Portsmouth, New Hampshire	70° 44′ 00″ W. 43° 04′ 33″ N.	NAC	150	U.S. Navy ..	600	O	N	—	—
Sagaponack, N.Y. ..	—	WSK	—	Marconi Co. ..	—	—	—	—	—
Saint Augustine, Florida	North-east coast of Florida 81° 17′ 05″ W. 29° 53′ 20″ N.	NAP	100	U.S. Navy ..	300, 600	P G[160] ..	N	0.30	3.00
San Diego, California[168] ..	117° 15′ 00″ W. 32° 42′ 26″ N.	NPL	200	U.S. Navy ..	300, 600, 1,000, 1,800	P G	N	0.40	4.00
San Francisco	—	KPH	—	Marconi Co ..	—	—	—	—	—
San Luis Obispo, Cal. ..	—	KDN	—	Marconi Co. ..	—	—	—	—	—
San Pedro, California ..	118° 17′ 00″ W. 33° 44′ 00″ N.	KPJ	350	Marconi Co. ..	300, 600	P G	N	—[189]	—
Sault Ste. Marie, Mich. ..	—	WSI	—	Marconi Co. ..	—	—	—	—	—
Savannah	Georgia 81° 06′ 15″ W. 32° 05′ 15″ N.	WSV	300	Marconi Co. ..	300, 600	P G	N[177]	0.30	3.00

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Sayville[178]	New York, Long Island 73° 06′ 12″ W. 40° 44′ 36″ N.	WSL	600, 2,300	Atlantic Communication Co.	300, **600**, 1,800 2,480, 2,800 2,900, 3,600, 4,800[179]	P G[180] ..	N	0.30[158] 0.60[159] 1.50[161]	3.00 6.00 15.00
Sea Gate, New York ..	—	WSE	—	Marconi Co.	—	— ..	—	—	—
Seattle	Washington 122° 20′ 00″ W. 47° 38′ 00″ N.	KPA	300	Marconi Co. ..	300, **600**	P G	N	0.30[158] 0.60[159]	3.00 6.00
Siasconset	Massachusetts, Nantucket Island 69° 58′ 19″ W. 41° 15′ 50″ N.	WCS	165	Marconi Co. ..	300, **600**	P G	N	0.30[158] 0.75[159]	3.00 7.50
South Wellfleet[178] ..	Massachusetts, Cape Cod 69° 58′ 18″ W. 41° 54′ 51″ N.	WCC	600	Marconi Co. ..	300, **600**, 2,040[182]	P G	N	0.30[158] 0.60[159] 1.50[161]	3.00 6.00 15.00
Tampa, Fla.	—	WPD	—	Marconi Co ..	—	—	—	—	—
Tatoosh[168]	Washington, off Cape Flattery 124° 44′ 06″ W. 48° 23′ 30″ N.	NPD	100	U.S. Navy	300, **600** 1,000	P G	N	0.40	4.00
Virginia Beach[183] ..	Virginia, entrance of Chesapeake Bay 75° 58′ 58″ W. 36° 50′ 36″ N.	WSY	150	Marconi Co. ..	300, **600**	P G	N	0.30	3.00
Washington, NAL ..	District of Columbia 77° 00′ 11″ W. 38° 52′ 21″ N.	NAL	150	U.S. Navy ..	600	O	N	—	—
Washington, WUP[184] ..	District of Columbia	WUP	—	U.S. Army ..	—	O	—	—	—
Washington, WUQ[185] ..	District of	WUQ	—	U.S. Bureau of	—	O	—	—	—

Burnett Inlet	—	KIU	—	Alaska Packers' Association	—	—	—	—	—
Chignik	—	KHC	—	Alaska Packers' Association	—	—	—	—	—
Circle City	—[100]	WVA	—	U.S. Army ..	—	P G, O.. ..	—	—	—
Clark's Point	—	KHG	—	Alaska Packers' Association	—	—	—	—	—
Cordova, Alaska	Prince William Sound 145° 58′ 55″ W. 60° 27′ 45″ N.	NPA	400	U.S. Navy ..	300, **600**, 1,800	P G	N	0.25	2.50
Dutch Harbor	Aleutian Islands, Unalashka 166° 32′ 08″ W. 53° 53′ 14″ N.	NPR	150	U.S. Navy ..	300, **600**, 1,800	P G	N	0.25	2.50
Fairbanks, Alaska ..	—[100]	WVB	—	U.S. Army ..	—	P G, O.. ..	—	—	—
Fort Egbert	—[100]	WVC	—	U.S. Army ..	—	P G, O.. ..	—	—	—
Fort Gibbon, Alaska ..	—[100]	WVD	—	U.S. Army ..	—	P G, O.. ..	—	—	—
Fort St. Michael	—	WVE	220	U.S. Army ..	**600**, 1,200[100]	P G, O.. ..	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Jualin	—	KJA	—	Alaska Packers' Association	—	—	—	—	—
Juneau	—	KDU	—	Marconi Co. ..	—	—	—	—	—
Kake	—	KIT	—	Alaska Packers' Association	—	—	—	—	—
Karluk	—	KHA	—	Alaska Packers' Association	—	—	—	—	—
Ketchikan	—	KPB	—	Marconi Co. ..	—	—	—	—	—
Kodiak	Hood Island, near the town of Kodiak 152° 21′ 52″ W. 57° 46′ 42″ N.	NPS	200	U.S. Navy ..	300, **600**, 1,800	P G	N	0.25	2.50
Kogiung	—	KHB	—	Alaska Packers' Association	—	—	—	—	—
Kotlik	—	WVF	53	U.S. Army ..	600	P G, O.. ..	Local time: 9 a.m. to 9 p.m.[101]	0.25	2.50
Naknek	—	KHT	—	Alaska Packers' Association	—	—	—	—	—
Nome, Alaska	—	WVG	260	U.S. Army ..	**600**, 1,400[100]	P G, O.. ..	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Nulato	—[100]	WVH	—	U.S. Army ..	—	P G, O.. ..	—	—	—
Nushagak	—	KHF	—	Alaska Packers' Association	—	—	—	—	—
Petersburg, Alaska ..	—	WVI	40	U.S. Army ..	600	P G, O.. ..	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Sitka Alaska	135° 20′ 55″ W. 57° 02′ 58″ N.	NPB	150	U.S. Navy ..	300, **600**, 1,800	P G	N	0.25	2.50
St. George, Alaska ..	Pribilof Islands 169° 43′ 00″ W. 56° 36′ 00″ N.	NPY	40	U.S. Navy ..	300	O	X	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*									
Alaska—*con'd.*	Meridian of Greenwich.							Francs.	Francs.
St. Paul, Alaska	Pribilof Islands 170° 16′ 20″ W. 57° 07′ 20″ N.	NPQ	200	U.S. Navy ..	300, **600**, 1,800	P G	N	0.25	2.50
Unalga	Aleutian Islands 166° 05′ 25″ W. 53° 57′ 55″ N.	NPV	400	U.S. Navy ..	300, **600**, 1,800	P G	N	0.25	2.50
Wrangell	—	WVJ	40	U.S. Army ..	600	P G, O.. ..	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Cuba									
Guantanamo Bay ..	South coast of Cuba 75° 08′ 30″ W. 19° 54′ 00″ N.	NAW	200	U.S. Navy ..	300, **600**, 1,800	P G	N	0.40	4.00
Havana	Cuba	HV	—	Marconi Co. ..	—	—	—	—	—
Hawaiian Islands									
De Russey	Honolulu	WZG	—	U.S. Army ..	—	O	—	—	—
Hecia Point	—	KHX	—	Federal Telegraph Co.	—	—	—	—	—
Honolulu	Island of Oahu 157° 51′ 43″ W. 21° 17′ 54″ N.	NPM	100	U.S. Navy ..	600	O	N	—	—
Kahuku	—	KHK	—	Mutual Telephone Co., Ltd.	—	—	—	—	—
Kaunakakai	—	KHO	—	Mutual Telephone Co., Ltd.	—	—	—	—	—
Kawaikae	—	KHN	—	Mutual Telephone Co., Ltd.	—	—	—	—	—
Koko Head	—	KHJ	—	Marconi Co. ..	—	—	—	—	—
Lahaina	—	KHL	—	Mutual Telephone Co., Ltd.	—	—	—	—	—
Lihue	—	KHM	—	Mutual Telephone Co., Ltd.	—	—	—	—	—

Guam	144° 44′ 08″ E. 13° 27′ 12″ N.	NPN	100	U.S. Navy	300, 600, 1,800	P G	N	0.25	2.50
Panama									
Balboa	Entrance of the Panama Canal 79° 33′ 30″ W. 8° 57′ 00″ N.	NPJ	200	U.S. Navy	300, 600, 1,800	P G	N	0.40	4.00
Colon	Entrance of the Panama Canal 79° 54′ 07″ W. 9° 22′ 08″ N.	NAX	400	U.S. Navy	300, 600, 1,800	P G, O.	N	0.40	4.00
Porto Bello Panama	79° 40′ 00″ W. 9° 33′ 45″ N.	NAY	100	U.S. Navy	300, 600	O	X	—	—
Philippine Islands									
Cavite	120° 54′ 35″ E. 14° 28′ 59″ N.	NPO	150	U.S. Navy	600	O	N	—	—
Corregidor Island	—	WVN	—	U.S. Army	—	O	—	—	—
Cuyo	121° 00′ 00″ E. 10° 50′ 00″ N	WVX	80	U.S. Army	600	P G, O.	—	—	—
Davao	125° 30′ 00″ E. 7° 00′ 00″ N.	WVO	80	U.S. Army	600	P G, O.	—	—	—
Fort Drum	—	WVP	—	U.S. Army	—	O	—	—	—
Fort Frank	—	WVL	—	U.S. Army	—	O	—	—	—
Fort Hughes	—	WVM	—	U.S. Army	—	O	—	—	—
Fort Wint.	—	WVR	—	U.S. Army	—	O	—	—	—
Fort Wm. McKinley	—	WVQ	—	U.S. Army	—	O	—	—	—
Jolo	121° 00′ 00″ E. 6° 10′ 00″ N.	WVS	160	U.S. Army	600	P G, O.	—	—	—
Malabang	124° 05′ 00″ E. 7° 00′ 00″ N.	WVT	160	U.S. Army	600	P G, O.	—	—	—
Manila	—	WVU	—	U.S. Army	—	O	—	—	—
Olongapo	120° 16′ 57″ E. 14° 49′ 26″ N.	NPT	200	U.S. Navy	600	O.	N	—	—
Puerto Princesa	118° 40′ 00″ E. 9° 40′ 00″ N.	WVV	80	U.S. Army	600	P G, O.	—	—	—
San Jose, Mindoro	121° 00′ 03″ E. 12° 27′ 30″ N.	WVY	170	U.S. Army	600	P G, O.	—	—	—
Zamboanga	122° 05′ 00″ E. 6° 50′ 00″ N.	WVW	270	U.S. Army	600	P G, O.	—	—	—
Porto Rico									
Ensanada	—	R PW	—	Guanica Controle	—	—	—	—	—
San Juan de Puerto Rico	66° 05′ 38″ W.	NAU	200	U.S. Navy	300, 600, 1,800	P G	N	0.40	4.00

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
	Meridian of Greenwich.							Francs.	Francs.
URUGUAY									
Banco Ingles [156]	To the south-east of Montevideo 55° 53′ 30″ W. 35° 06′ 30″ S.	UPY	100	—	450, **600**	—	—	—	—
Cerrito	Near Montevideo 56° 10′ 10″ W. 34° 51′ 20″ S.	UMV	1,000	—	**600**, 1,000, 1,250	P G	N	0.53	5,30
Isla de Lobos [156]	54° 53′ 01″ W. 35° 01′ 39″ S.	ULB	100	—	450, **600**	—	—	—	—
ZANZIBAR							Local time of Zanzibar		
Pemba, Zanzibar.. ..	39° 45′ 00″ E. 5° 14′ 00″ S.	PMB	85	—	600	P G [154] ..	8 a.m. to 12 a.m., 2 p.m. to 4 p.m.	0.20	1.60
Zanzibar	39° 11′ 00″ E. 6° 10′ 00″ S.	ZAR	85	—	600	P.G [155] ..	8 a.m. to 12 a.m., 2 p.m. to 4 p.m.	0,20	1.60

NOTES

Land Stations

1. On request the station furnishes to vessels at sea particulars of the weather forecasts issued by the Commonwealth Meteorologist. Radiotelegraph rate: fr. 2.40 for 20 words and fr. 0.10 for each additional word. The station also accepts at the same rates communications from captains of vessels to the Commonwealth Meteorologist.

2. Port Moresby and Thursday Island intercommunicate by means of wireless telegraphy.

3. For long-range communication.

4. 4 hours 17 minutes later than Greenwich time.

5. The hours are extended on the dates of arrival and departure of the regular steamers of the Compagnie Belge Maritime du Congo.

6. Station open for public correspondence in the inland service of the Belgian Congo.

7. The station also communicates by radiotelegraphy with Loango.

8. For correspondence with the Belgian Government steamers on the voyage between Dover and Ostend. No special coast charge. The total wireless charge is fixed at fr. 1.50 per radiotelegram of 10 words or less, with fr. 0.10 additional for each word over ten.

9. In the case of radiotelegrams originating at or intended for Bahia (S. Salvador), the charge for transmission between the coast station and Bahia is included in the coast charge.

10. In the case of radiotelegrams originating at or intended for Rio de Janeiro, the charge for transmission between the coast station and Rio de Janeiro is included in the coast charge.

11. In the case of radiotelegrams originating at or intended for Campos or Rio de Janeiro, the charge for transmission between the coast station and Campos or Rio de Janeiro is included in the coast charge.

12. In the case of radiotelegrams originating at or intended for Fernando de Noronha or Recife (Pernambuco), the charge for transmission between the coast station and Fernando de Noronha or Recife is included in the coast charge.

13. Under construction.

14. In the case of radiotelegrams originating at or intended for Pelotas or Rio Grande do Sul, the charge for transmission between the coast station and Pelotas or Rio Grande do Sul is included in the coast charge.

15. In the case of radiotelegrams originating at or intended for Florianopolis (Desterro, S. Catharina), the charge for transmission between the coast station and Florianopolis is included in the coast charge.

16. Identical with the call-signal of the British ship station Cambria M C G.

17. In the case of radiotelegrams originating at or intended for Santos, the charge for transmission between the coast station and Santos is included in the coast charge.

18. In case of need, the hours of service are extended.

19. In the case of radiotelegrams originating at or intended for Olinda or Recife (Pernambuco), the charge for transmission between the coast station and Olinda or Recife is included in the coast charge.

20. The station also exchanges public and official correspondence with Trinidad.

21. The station is open primarily for the ordinary telegraph service; and communicates with ships only in case of distress.

22. Burmese time; 6 hours 30 minutes in advance of Greenwich time.

23. During the day-time the station is largely occupied with inland communication.

24. The station receives from the Director-General of Observatories daily at about 1 p.m. a concise telegram concerning atmospheric conditions over the Arabian Sea, for communication to ships at their request. The charge for these radiotelegrams—viz., fr. 0.40 per word—is debited to the ships. When there is nothing special to communicate, these radiotelegrams contain simply the word "Normal." In stormy weather the Meteorological Department gives due warning.

25. The station receives from the Director-General of Observatories daily at about 1 p.m. a concise telegram concerning the atmospheric conditions over the Bay of Bengal for communication to ships at their request. The charge for these radiotelegrams—namely, fr. 0.40 per

word—is debited to the ships. These radiotelegrams contain the word "Flags," followed by four code letters indicating the predominant atmospheric conditions over the four quarters of the Bay of Bengal. In stormy weather the Meteorological Department adds a short notice in plain language.

26. In advance of Greenwich time by 3 hours 51 minutes.

27. Time of British India; 5 hours 30 minutes in advance of Greenwich time.

28. The station also exchanges public and official correspondence with Berbera Radio.

29. The station also exchanges public and official correspondence with Aden Radio.

30. In the case of radiotelegrams neither originating at nor intended for Berbera itself, the coast charge is included in the charge for transmission between Aden and Berbera.

31. 5 hours 7 minutes 10.65 seconds west of Greenwich.

32. The station also exchanges public and official correspondence with Trinidad.

33. In the case of radiotelegrams originating at or intended for Port of Spain (Trinidad) or Scarborough (Tobago), the charge for transmission between the coast station and either of these places is included in the coast charge. The charges applicable to the transmission of radiotelegrams to other places will be notified to ship stations by the coast station.

34. The station also exchanges public and official correspondence with Tobago.

35. Accounts should be rendered to the Marconi Wireless Telegraph Company of Canada, Montreal. These stations are operated by this Company.

36. The station also communicates by radiotelegraphy with Cape Sable and Sable Island.

37. In the case of radiotelegrams exchanged between Cape Sable or Sable Island and Camperdown, a charge is made for the retransmission, at the rate of fr. 0.30 per word, with a minimum of fr. 3.00 per radiotelegram. This charge should be credited to the Marconi Wireless Telegraph Company of Canada, Montreal.

38. The station is open only in winter—*i.e.*, from December to March.

The station belongs to the Canadian Government; it is operated and controlled by the Naval Minister.

39. For radiotelegrams sent by or addressed to the commander of a ship and relating to the service of the ship, the coast charge is 25 centimes per word, with a minimum of fr. 2.50 per radiotelegram. The preamble of such radiotelegrams should contain the service instruction S.B.

40. For radiotelegrams sent from or addressed to ships engaged in the local service between Victoria, Vancouver and Seattle, the coast charge is fr. 0.15 per word, with a minimum of fr. 1.50 per radiotelegram. The preamble of such radiotelegrams should contain the service instruction F. B.

41. Accounts should be rendered to the District Superintendent, B. C. Division, Government Wireless Service, Victoria, B. C.

42. The station is open only during the season of navigation, approximately April to December.

43. The station also communicates by radiotelegraphy with Camperdown.

44. Pacific time; 8 hours later than Greenwich time.

45. 4 hours later than Greenwich time.

46. All these stations receive weather forecasts from the Canadian Meteorological Service at 10 p.m. These advices will be transmitted free to any ship station on request. In addition, the station transmits without coast charge radiotelegrams of the following kinds:—

1. Any message concerning the navigation of a vessel sent by the captain of the vessel and intended for any department of the Government, any officer of the Government, or the officer in charge of any coast station.

2. Messages regarding the state of the weather, the condition of the tide or ice, or containing information intended to assist navigation.

3. Any communication between the captain of a vessel and any other person.

46a. These stations are open during the fishing season only, approximately from July to October.

47. Public correspondence is admitted, without any coast charge, when the station is for the time being not engaged with official correspondence.

48. Small auxiliary station of the Radiotelegraph School.

49. Five hours after Greenwich time.

50. Station belonging to the Marconi International Marine Communication Company, London, and the Eastern Extension Australia and China Telegraph Company, London; the station is operated and controlled by the latter company.

51. The station exchanges telegrams with Curaçao.

52. The station also exchanges telegrams with Aruba and Bonaire.

53. Radiotelegraphic communication with ships at sea only in case of distress.

54. Radiotelegrams are accepted only at sender's risk.

55. For the present no coast charge is made.

56. Later than Greenwich time by 3 hours 55 minutes.

57. The station accepts only messages received from Mogadiscio I S G.

58. This station also communicates by radiotelegraphy with the other stations in the Fiji Islands. The charge for the transmission of radiotelegrams between two coast stations in the Fiji Islands is fr. 0.30 per word. In addition, the station exchanges meteorological telegrams with ships in stormy weather.

59. Twelve hours in advance of Greenwich time.

60. From Monday to Friday, 9 a.m. to 1 p.m., 2 p.m. to 3 p.m., or until the completion of the work, and at 7 p.m. until the completion of the work; Saturday, 9 a.m. to 1 p.m., or until the completion of the work; Sunday and public holidays, 8 a.m. to 8.30 a.m., and at 7 p.m. until the completion of the work.

61. The coast charge is reduced to fr. 0.15 per word for correspondence with ships engaged in a regular service between France on the one hand and Corsica, Algeria and Tunis on the other hand.

62. The coast charge is reduced to fr. 0.15 per word for correspondence with ships whose home ports are on the coast of the English Channel and the Straits of Dover, and which are engaged in a regular service between France and England.

63. Experimental station, also open for distress calls.

64. Station of the State Railway Administration used to conduct the marine business of the ships employed on the service between Dieppe and Newhaven.

65. The station also communicates by radiotelegraphy with Boma and Brazzaville.

66. Continuous service during the voyages of the regular steamers.

67. Meteorological telegrams are transmitted at 9.30 a.m.

68. The wave-length of 1,600 metres is used for communication with Rufisque. The station also listens on the wave-length of 300 metres.

69. The station also listens on the wave-length of 300 metres. The wave-length of 900 metres is used in particular for communication with Rufisque.

70. The station is connected to the inland telegraph system through the Rufisque station. The charge applicable to transmission in either direction between Port-Etienne and Rufisque is fr. 0.30 per word.

71. The station also listens on the wave-length of 300 metres. The wave-length of 1,600 metres is used for transmission and for all communications with Port-Etienne and Conakry.

72. The station exchanges radiotelegrams with Port-Etienne and Dakar and only communicates with ships as substitute for Dakar.

73. The working of the station is temporarily suspended.

74. For telegrams of which the only wireless transmission takes place between the lightship and the shore, a fixed charge of fr. 1.00 per telegram only is collected, in addition to the ordinary charges for transmission over the land lines.

75. Public correspondence restricted to urgent messages relating to navigation.

76. The station communicates only with the ships of the Norddeutscher Lloyd Company and only as regards the reception of radiotelegrams.

77. Storm-warnings directed to the German Baltic coast are transmitted three times on the wave-length of 450 metres, as soon as the station has the information. They are repeated once at 1 p.m. and 11 p.m. (Central European time). For other warnings of storms, see Cuxhaven and Norddeich.

78. When the working of the Norddeich station is interrupted, storm-warnings are transmitted three times, as required, on the wave length of 1,650 metres, as soon as the station has the information. They are repeated at once at 1 p.m. and 11 p.m. (Central European time). Storm-warnings directed only to the German Baltic coast are sent out by the Bülk station.

79. The station is prepared to receive calls chiefly during the first 15 minutes of each of its hours of service.

80. The station communicates only with fishing and coasting vessels.

81. The station transmits on the wave-length of 1,650 metres:

a. Time-signals: 12 a.m. and 12 p.m. (Greenwich mean time).

Method of transmission:

from 11^{53}—11^{55}, preparatory signals v v v v .....

at $11^{57' \, 47''}$ —.—.— (call)

— — — —.— —.. (Greenwich mean time)

at $11^{58' \, 38''}$ —.—.— (call)

from $11^{58' \, 46''}$—$11^{58' \, 50''}$
from $11^{58' \, 56''}$—$11^{59' \, 00''}$
from $11^{59' \, 06''}$—$11^{59' \, 10''}$
from $11^{59' \, 36''}$—$11^{59' \, 40''}$
from $11^{59' \, 46''}$—$11^{59' \, 50''}$
from $11^{59' \, 56''}$—$12^{00' \, 00''}$

a dash lasting ⅓ second at the end of each second precisely.

at $12^{00' \, 06''}$.—.—. (end)

b. Notices of importance intended for navigators (displacement of lights, etc.) transmitted as required, and repeated three times, as soon as received. These messages are repeated three times immediately after the time-signals, at 12 a.m. and 12 p.m. (Greenwich mean time).

c. Meteorological telegrams, daily at 1 p.m. (Central European time).

d. Storm-warnings intended for the German North Sea coast, transmitted as required, and repeated three times, as soon as received. These warnings are repeated once at 1 p.m. or 11 p.m. (Central European time). When the working of the Norddeich station is interrupted, the storm-warnings are sent out in the same manner by the Cuxhaven station. Storm-warnings intended only for the German Baltic coast are sent out from Bülk.

82. Official correspondence with Trälleborg and with the ferry-boats of the Sassnitz-Trälleborg line, concerning the railway traffic.

83. Public correspondence with the ferry-boats of the Sassnitz-Trälleborg line.

84. The station is prepared to receive calls chiefly during the first fifteen minutes of the second half of each of its hours of service.

85. The station also communicates by radio-telegraphy with S. Isabel de Fernando Poo.

86. Twenty minutes later than Central European time.

87. *a.* Time-signals automatically regulated, on the wave-length of 1,250 metres, daily at 12 a.m. and 8 p.m. (time of the east coast of China eight hours in advance of Greenwich mean time).

Method of transmission:

56′ 00″—50″ x x x ...... for tuning.

57′ 55″—56″ dash
57″—58″ dash
59″—60″ dash
58′ 08″—09″ dash
10″ dot
18″—19″ dash
20″ dot
28″—29″ dash
30″ dot
38″—39″ dash
40″ dot
48″—49″ dash
50″ dot
55″—56″ dash
57″—58″ dash
59″—60″ dash
59′ 06″—07″ dash
08″—09″ dash

59′ 10″ dot
16″—17″ dash
18″—19″ dash
20″ dot
26″—27″ dash
28″—29″ dash
30″ dot
36″—37″ dash
38″—39″ dash
40″ dot
46″—47″ dash
48″—49″ dash
50″ dot
55″—56″ dash
57″—58″ dash
59″—60″ dash

A dash lasts 1 second.
A dot lasts $\frac{1}{4}$ second.

b. Signals giving warnings of typhoons, storm-warnings, and urgent notices of importance intended for navigators (displacement of lights, etc.) transmitted on the wave-length of 600 metres as soon as received.

c. Meteorological telegrams concerning the prevailing conditions at 6 a.m. (time of the east coast of China), and, where necessary, a repetition of the storm-warnings immediately after the second transmission of the news messages of the Ostasiatischer Lloyd on the wave-length of 1,250 metres.

The news messages are transmitted on the wave-length of 1,250 metres at 1.30 a.m. and 2.30 p.m. (time of the east coast of China); between the first and the second transmission there is a break of fifteen minutes.

88. At the request of ships, and on payment of the charges, transmission of meteorological reports (not more than twenty words), giving the following information:

a. A general summary of the atmospheric conditions of the morning of the day of transmission of the report;

b. A forecast of the weather—strength and direction of the wind—applicable to the German North Sea coast for the day (12 p.m. to 12 p.m.) following the transmission of the forecast;

c. A storm-warning, if required.
Charge per word: fr. 0.18, without minimum.

89. At the request of ships, and on payment of the charges, transmission of meteorological reports (not more than twenty words), giving the following information:

a. A general summary of the atmospheric conditions of the morning of the day of transmission of the report;

b. A forecast of the weather—strength and direction of the wind—applicable to the west part of the German Baltic coast for the day (12 p.m. to 12 p.m.) following the transmission of the forecast;

c. A storm-warning, if required.
Charge per word: fr. 0.18, without minimum.

90. At the request of ships, and on payment of the charges, transmission of meteorological reports (not more than twenty words), giving the following information:

a. A general summary of the atmospheric conditions of the morning of the day of transmission of the report;

b. A forecast of the weather—strength and direction of the wind—applicable to the east part of the German Baltic coast for the day (12 p.m. to 12 p.m.) following the transmission of the forecast;

c. A storm-warning, if required.
Charge per word: fr. 0.18, without minimum.

91. Special correspondence, including official and ordinary telegrams exchanged with Rathlin Island.

92. For radiotelegrams exchanged with all ships which do not sail to or from a port in the United Kingdom, and for radiotelegrams exchanged with ships making regular voyages of more than 1,000 miles from a port in the United Kingdom. In the case of radiotelegrams originating in or destined for the United Kingdom, the charge is fr. 0.65 per word, including the coast charge and the charge for transmission over the telegraph lines.

93. For radiotelegrams exchanged with ships making regular voyages of more than 200 miles but not more than 1,000 miles to or from a port in the United Kingdom. In the case of radiotelegrams originating in or destined for the United Kingdom the charge is fr. 0.35 per word, with a minimum of fr. 2.10 per radiotelegram, including the coast charge and the charge for transmission over the telegraph lines.

94. For radiotelegrams exchanged with ships making regular voyages of 200 miles or less to or from a port in the United Kingdom. In the case of radiotelegrams orginating in or destined for the United Kingdom the charge is fr. 0.20 per word, with a minimum of fr. 2,00 per radiotelegram, including the coast charge and the charge for transmission over the telegraph lines.

95. A fixed charge of fr. 1.00 per radiotelegram is made, in addition to the ordinary telegraph charges.

96. Special correspondence, including official and ordinary telegrams exchanged with Skegness.

97. Special correspondence, including official and ordinary telegrams exchanged with Tobermory.

98. Special correspondence with the Dieppe coast station.

99. The wave-length of 600 metres is used solely for communication with Scheveningen-Port. Such communication takes place only in case of urgent need.

100. Special correspondence, including official and ordinary telegrams exchanged with Ballycastle, Antrim.

101. Special correspondence, including official and ordinary telegrams exchanged with Hunstanton.

102. Special correspondence, including official and ordinary telegrams exchanged with Lochboisdale.

103. Correspondence restricted to messages exchanged with the steamers of the South Eastern and Chatham Railway Company.

104. Correspondence restricted to the transmission of radiotelegrams to ships at sea when they are out of range of any other British station.

105. The station is intended for: (*a*) the transmission to the Scheveningen-Port coast station of telegrams received by means of flag signals from ships passing within sight, or the retransmission by means of these signals, to such ships, of telegrams sent to it through the Scheveningen-Port coast station; (*b*) meteorological services.

106. Telegrams originating on or intended for ships and forwarded through Scheveningen-Port are subject to the coast charge of Scheveningen-Port, the charge for transmission over the inland telegraph lines, and a fixed charge of fr. 1.00 per telegram.

107. The station transmits daily to ships, on request, a meteorological telegram which will be charged to the account of the ships.

108. The charge applicable to the transmission of radio-telegrams between the stations of Italian Somaliland is fixed at fr. 2.52 per radio-telegram of ten words or less, with fr. 0.25 additional for each word over ten.

109. Station operated and controlled by the Ministry of State Railways, exclusively for the service of the steam ferry-boats of the Strait of Messina.

110. The station also transmits messages to the coast station Massaua. Charge per word: fr. 0.60.

111. Correspondence limited to radio-telegrams intended for the locality bearing the same name as the coast station.

112. The station also exchanges ordinary telegrams originating in or intended for Montenegro.

113. The station transmits on the wave-length of 600 metres each night, except Sunday, the mean time of Central Japan (time of the meridian 135° E.).

Form of transmission:

8.59′	00″—55″	— — — — — — — — — — — — —, etc.
9.00′	00″—01″	—
	30″—55″	—.—.—.—.—.—, etc.
01′	00″—01″	—
	30″—55″	—..—..—..—..—.., etc.
02′	00″—01″	—
	30″—55″	—...—...—...—..., etc.
03′	00″—01″	—
	30″—35″	—....—....—....—, etc.
04′	00″—01″	—

114. This charge includes the charge applicable to the transmission over the lines of the Japanese telegraph service of radio-telegrams originating in or intended for the Empire of Japan and Southern Manchuria; but for urgent radio-telegrams there is an additional charge of fr. 0.25 per word.

115. The station also communicates by radio-telegraphy with Dzaoudzi. It is also used, when necessary, for the exchange of telegrams with Majunga. Charge per word: fr. 0.10.

116. The station also communicates by radio-telegraphy with Majunga.

117. The station also communicates by radio-telegraphy with Dzaoudzi.

117a. The reception and despatch of messages may be suspended for short periods and the station is subject to be closed at short notice.

118. The station also exchanges ordinary telegrams originating in or intended for Lower California.

119. The station also exchanges ordinary telegrams originating in or intended for the peninsula of Yucatan.

120. The station transmits the time of the meridian of Tacubaya daily at 12 a.m. in the following manner:

From 11.55 a.m. to 12 a.m.: repeated transmission of the inquiry signal "CQ"; then repeated transmission of the signal "XH" (time of Tacubaya);

At 12 a.m.: transmission of the word "noon," always followed by a free announcement of the state of the weather.

On request, this announcement will also be transmitted to ships at other times, in return for a charge which must not exceed that for a radio-telegram of twenty words and which will be debited to the ships.

During the transmission of the time-signals and of the meteorological announcement at 12 a.m., all other transmission will be stopped, except distress calls. Special warnings necessitated by sudden changes in the state of the atmosphere, by accidents at sea, and by the derangement or displacement of signs intended as aids to navigation (buoys, sea-marks, etc.), will also be transmitted free.

121. Six hours 36 minutes 46^{67} seconds later than Greenwich time.

122. In advance of Greenwich time by 11 hours 30 minutes.

123. Meteorological radiotelegrams are sent free of charge and as opportunity offers.

124. The transit charge is fr. 0.40 per word.

125. In course of construction.

126. The night service is performed alternately by the Flekkerö and Tjömö stations. Flekkerö is open during the nights of Tuesday, Thursday, and Saturday. Tjömö is open during the nights of Monday, Wednesday, and Sunday. The service between 8 a.m. Sunday and 8 a.m. Monday is performed alternately by the two stations.

127. During the months from May to September.

128. During the months from October to April.

129. From the 15th of June to the 30th of September.

130. From the 1st of October to the 14th of June.

131. Röst and Sörvaagen intercommunicate by means of wireless telegraphy.

132. The station also exchanges radiotelegrams with the other coast stations situated in the Azores, within its radius of operation.

133. Public correspondence limited to the ships *Dacia, Imparatul Traian, Principesa Maria, Regele Carol I* and *Romania.*

134. A fixed charge of fr. 1.50 plus fr. 0.25 per word for radiotelegrams intended for the Black Sea, fr. 0.30 for those intended for the Sea of Marmora, and fr. 0.35 for those intended for the Ægean Sea and the Mediterranean Sea, in addition to the ordinary telegraph charges.

135. The station communicates only with Nicolaiewsk RNL.

136. The station also communicates by radiotelegraphy with Kerbinskaïa.

137. Station reserved for the Service of the Gulf of Riga.

138. The station is open only during the season of navigation.

139. The coast charge is reduced to fr. 0.13 per word for correspondence with Russian ship stations.

140. For radiotelegrams exchanged between the stations Rade de Taganrog and Taganrog, there is an additional charge of fr. 0.40 per radiotelegram, plus fr. 25 per word.

141. The station transmits each day, at 1 p.m., a report in plain language containing information concerning the meteorological conditions prevailing on the whole of the coast of the Union of South Africa.

142. Under construction.

143. The station transmits only correspondence of the Compagnie transatlantique espagnole.

144. Station of the Ministry of Marine.

145 Opened provisionally.

146. The station also communicates by radiotelegraphy with Duala.

147. A charge of fr. 0.20 per word, in addition to the coast charge, is made for the delivery of radiotelegrams intended for the island of Fernando Po.

148. Correspondence with the ferry-boats of the Trälleborg-Sassnitz line.

149. Official correspondence with Sassnitz and with the ferry-boats of the Trälleborg-Sassnitz line, concerning the railway traffic.

150. The coast charge is reduced to fr. 0.15 per word for correspondence with ships engaged in a regular service between France on the one hand, and Corsica, Algeria, and Tunis on the other hand.

151. The station is employing provisionally a wave-length of 300 metres only.

153. Under construction.

154. The station also exchanges public and official correspondence with Zanzibar.

155. The station also exchanges public and official correspondence with Pemba.

156. Station reserved for Marconi service radiotelegrams; general public correspondence is accepted only in case of accident to the station S. Pedro, California.

157. The station sends time-signals for five minutes on wave-length of 2,500 metres commencing at 11.55 a.m. and 9.55 p.m. every day, Sundays and holidays included. Final signals at 12 noon and 10 p.m. (time of the meridian 75° west of Greenwich). Every tick of the standard clock of the Naval Observatory, Washington, is transmitted as a dot, omitting the 29th second of each minute, the last five seconds of each of the first four minutes, and finally the last ten seconds of the last minute. The 12 noon and 10 p.m. signal is a dash.

158. For radiotelegrams exchanged with ships in North and South American service.

159. For radiotelegrams exchanged with ships in transoceanic service.

160. The station is open for general benefit of shipping. The station sends out information concerning obstructions in paths of navigation such as wrecks, derelicts, etc., and aids to navigation deranged or misplaced four times daily, at 8 a.m., 12 noon, 4 p.m., and 8 p.m. The station also sends local weather forecast at 12 noon and storm-warnings four times at hours mentioned above. The foregoing information is supplied passing ships at other hours on request.

161. The station handles public correspondence in emergencies, when the coast rate will be furnished on request.

162. The station sends time-signals daily at noon (time of the meridian 75° west of Greenwich), Sundays and holidays excluded, on the wave-length of 1,000 metres. Signals same as in note 157.

163. The station is open only during the season of navigation.

164. The station communicates with the coast through Beaufort, North Carolina.

165. The station furnishes information of interest to ships on request.

166. The operator is generally at the receiver at the beginning of each hour.

167. 15th April—15th December: 7 a.m.—12 noon, 1 p.m.—6 p.m. and 7 p.m.—8 p.m.; 15th December—15th April: 7 a.m.—12 noon, 1 p.m.—7 p.m. (time of the meridian 90° west of Greenwich).

168. The station sends time-signals daily at noon (time of the meridian 120° west of Greenwich), Sundays and holidays excluded, on the wave-length of 1,000 metres. Signals same as in note 3. Time furnished by Observatory at Navy Yard, Mare Island (California).

169. Army Signal School.

170. Coast Artillery School.

171. The station is reserved for general public service overland with El Paso (Texas), Phoenix (Arizona) and a station at Los Angeles (California).

172. The station communicates with the coast through Charleston, South Carolina, and Beaufort, North Carolina.

173. The station communicates with the coast through Newport, Rhode Island.

174. The station transmits daily news without charge, using the wave-length of 1,610 metres.

175. The wave-length of 1,800 metres is used for special correspondence.

176. The wave-length of 1,610 metres is used for special correspondence with the Wanamaker Building station in New York.

177. On Mondays and Thursdays the station closes at 12 p.m.

178. Long-range station.

179. The wave-lengths exceeding 1,600 metres are used for long-range and special correspondence.

180. A daily bulletin is transmitted free of charge from 9.15 p.m. to 10.15 p.m. (time of the meridian 75° west of Greenwich).

181. For radiotelegrams transmitted a distance exceeding 400 miles.

182. The wave-length of 2,040 metres is employed for long-range correspondence.

183. The station transmits weather reports daily at 8 a.m. (time of the meridian 75° west of Greenwich).

184. United States Army Signal Corps Laboratory.

185. United States Bureau of Standards.

186. The station is reserved for general public service overland with Fort Worth, Phoenix (Arizona) and a station at Los Angeles (California).

187. Wanamaker.

188. For radiotelegrams exchanged with ships on North and South American service: fr. 0.30 per word, minimum fr. 3; for radiotelegrams exchanged with ships on transoceanic service: fr. 0.60 per word, minimum fr. 6; for radiotelegrams exchanged with the ships *Hermosa* and *Cabrillo*: fr. 0.10 per word, minimum fr. 1. (Address and signature free of charge.) For radiotelegrams exchanged with Avalon, Catalina Island: fr. 1.50 for the first ten words and fr. 0.10 for each additional word. (Address and signature free of charge.)

189. The Marconi Wireless Telegraph Co. of America.

190. The long wave-length is used for inland communication.

191. The station is open only during the season of navigation.

192. Interior station.

CALL LETTERS

THE BUREAU INTERNATIONAL DE L'UNION TELEGRAPHIQUE OF BERNE allots to the various nations who are parties to the International Radiotelegraphic Convention combinations of "call" letters which are in turn allotted to ship and land stations. In consequence of the enormous growth of wireless telegraphy, the necessity has arisen for a revision of the list of call letters allotted to signatories of the Convention, and at present the countries named below have had reserved for their exclusive use the letters which are given against their names :—

Great Britain.—All combinations commencing with B, G and M.

Colonies of Great Britain.—Combinations CAA to CMZ.

Greece.—Combinations SVA to SZZ.

Germany.—All combinations of letters commencing with A and D, as well as the combinations KAA to KCZ.

Austro-Hungary and Bosnia-Herzegovina.—All combinations of letters commencing with OAA to OMZ, as well as UNA to UZZ.

Belgium.—Combinations ONA to OTZ.

Brazil.—Combinations EPA to EZZ.

Bulgaria.—Combinations SRA to SRZ.

Chili.—Combinations COA to CPZ.

Denmark.—Combinations OUA to OZZ.

Egypt.—Combinations SUA to SUZ.

Spain.—Combinations EAA to EGZ.

France.—All combinations of letters commencing with F, as well as the combinations UAA to UMZ.

Italy.—All combinations commencing with I.

Japan.—All combinations commencing with J.

Morocco.—Combinations CNA to CNZ.

Mexico.—Combinations XAA to XCZ.

Monaco.—Combinations CQA to CQZ.

Norway.—Combinations LAA to LHZ.

Netherlands.—Combinations PAA to PMZ.

Portugal.—Combinations CRA to CTZ.

Roumania.—Combinations CVA to CVZ.

Russia.—All combinations commencing with R.

Sweden.—Combinations SAA to SMZ.

Turkey.—Combinations TAA to TMZ.

United States of America.—All combinations of letters commencing with N and W, as well as the combinations KIA to KZZ.

Uruguay.—Combinations CWA to CWZ.

SHIP STATIONS

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
ARGENTINE (REPUBLIC)							Francs.	Francs.
Almiranie Brown	LKA	—	Warship	450, **600**	O	N	0.40	4.00
Andes (Los), LKR	LKR	—	Warship	450, **600**	O	N	0.40	4.00
Avellaneda	LMK	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Belgrano	LKB	—	Warship	450, **600**	O	N	0.40	4.00
Berlin, LLM	LLM	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Berna	LLN	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Bruselas	LLO	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Buenos Aires, LKC	LKC	—	Warship	450, **600**	O	N	0.40	4.00
Buenos Aires, LLP	LLP	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Cabo Corrientes	LMO	300	A. M. Delfino y Hermano, Buenos-Aires	600	P G ..	N	0.40	4.00
Cabo Santa Maria	LMN	300	A. M. Delfino y Hermano ..	600	P G ..	N	0.40	4.00
Camasrone	LME	600	A. M. Delfino y Hermano ..	300, 450, **600**	P G ..	N	0.40	4.00
Catamarca	LKD	—	Warship	450, **600**	O... ..	N	0.40	4.00
Chaco	LKE	—	Warship	450, **600**	O	N	0.40	4.00
Colonia, LLQ	LLQ	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Cordoba, LKF	LKF	—	Warship	450, **600**	O	N	0.40	4.00
Draga 209	LLH	—	Government	500	O	N	0.40	4.00
Draga 210	LLI	—	Government	500	O	N	0.40	4.00
Draga 211	LLJ	—	Government	500	O	N	0.40	4.00
Entre Rios, LKH	LKH	—	Warship	450, **600**	O	N	0.40	4.00
Eolo	LLR	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Espora	LKI	—	Warship	450, **600**	O	N	0.40	4.00
Fragata Sarmiento	LKJ	—	Warship	450, **600**	O	N	0.40	4.00
Garibaldi, LKK	LKK	—	Warship	450, **600**	O	N	0.40	4.00
Gaviota	LKL	—	Warship	450, **600**	O	N	0.40	4.00
Guarany	LLS	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Guardia Nacional	LKM	—	Warship	450, **600**	O	N	0.40	4.00
Helios, LLT	LLT	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Independencia	LKN	—	Warship	450, **600**	O	N	0.40	4.00
Jujuy	LKO	—	Warship	450, **600**	O	N	0.40	4.00
Labrador	LLU	80	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Lambaré	LLV	135	Co. Nicolás Mihanovich	300, **600**	O	N	0.40	4.00
Libertad	LKQ	—	Warship	450, **600**	O	N	0.40	4.00
Londres..	LLW	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Luna	LLX	80	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Madrid	LLY	135	Co. Nicolás Mihanovich	300, **600**	P G ..	N	0.40	4.00
Maipu	LKS	—	Warship	450, **600**	O	N	0.40	4.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	P G ..	N	[illegible]	[illegible]

Parana, LKW	LKW	—	Warship	[illegible], 600	O	N	0.40	4.00
Paris	LLZ	135	Co. Nicolás Mihanovich	450, 600	O	N	0.40	4.00
Patagonia	LKX	—	Warship	300, 600	P G ..	N	0.40	4.00
Patria	LKY	—	Warship	450, 600	O	N	0.40	4.00
Piedrabuena	LKZ	—	Warship	450, 600	O	N	0.40	4.00
Plata (El), LKG	LKG	—	Warship	450, 600	O	N	0.40	4.00
Plata (La), LKP	LKP	—	Warship	450, 600	O	N	0.40	4.00
Presidente Mitre	LMG	600	A. M. Delfino y Hermano ..	450, 600	O	N	0.40	4.00
Presidente Quintana	LMH	600	A. M. Delfino y Hermano ..	300, 450, 600	P G ..	N	0.40	4.00
1° de Mayo	LLA	—	Warship	300, 450, 600	P G ..	N	0.40	4.00
Pueyrredón	LLB	—	Warship	450, 600	O	N	0.40	4.00
Rawson	LML	135	Co. Nicolás Mihanovich	450, 600	O	N	0.40	4.00
Rio de la Plata, LMI	LMI	150	Santiago Lambruschini	300, 600	O	N	0.40	4.00
Rio Uruguay	LMJ	150	Santiago Lambruschini	300, 600	O	N	0.40	4.00
Rivadavia	LLC	—	Warship	300, 600	O	N	0.40	4.00
Rivadavia	LMM	—	Co. Nicolás Mihanovich	450, 600	O	N	0.40	4.00
Roma, LMA	LMA	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Rosario, LLD	LLD	—	Warship	300, 600	P G ..	N	0.40	4.00
S. Martin, LLE	LLE	—	Warship	450, 600	O	N	0.40	4.00
S. Martin, LMM	LMM	135	Co. Nicolás Mihanovich	450, 600	O ..	A	0.40	4.00
Toro	LMP	500	S.A. de Navigation Sud Atlántica, Buenos-Aires	300, 600	P G ..	N	0.40	4.00
				300, 600	P G ..	7 a.m. to 11 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Tritón, LMB	LMB	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Uruguay, LLF	LLF	—	Warship	450, 600	O	N	0.40	4.00
Vapor 118B	LLL	—	Government	500	O	N	0.40	4.00
25 de Mayo	LLG	—	Warship	450, 600	O	N	0.40	4.00
Venus, LMC	LMC	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Viena	LMD	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
AUSTRALIAN COMMONWEALTH								
Australia, VKA	VKA	—	Government	600	O	—	—	—
Brisbane, VKB	VKB	—	Government	600	O	—	—	—
Bombala	VHF	Day, 200; night, 800	—	300, 600	—	—	—	—
Canberra	VHO	Day, 200; night, 800	Howard, Smith Co.	300, 600	—	—	—	—
Cerberus	VKO	—	Government	600	O	—	—	—
Cockburn Sound base ..	VKR	—	Government	600	O	—	—	—
Cooma	VJE	Day, 300; night, 700	—	—	—	—	—	—
Derwent, VKK	VKK	—	Government	600	O	—	—	—
Dimboola	VHL	Day, 200; night, 800	Melbourne S.S. Co.	300, 600	—	—	—	—
Encounter, VKE	VKE	—	Government	600	O	—	—	—
Fiona	VHQ	—	Colonial Sugar Refining Co. ..	—	—	—	0.40	—
Flinders Island base	VKP	—	Government	600	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
AUSTRALIA—*contd.*							Francs.	Francs.
Garden Island base	VKQ	—	Government	**600**	O	—	—	—
Grantala	VHJ	Day, 200; night, 800	Adelaide S.S. Co.	300, **600**	—	—	—	—
Indarra, VHP	VHP	Day, 200; night, 800	Australasian United S.N. Co. ..	300, **600**	—	—	—	—
Kanowna	VHD	Day, 200; night, 800	—	300, **600**	—	—	—	—
Kapunda	VHM	Day, 200; night, 800	Melbourne S.S. Co.	300, **600**	—	—	—	—
Karoola	VHE	Day, 200; night, 800	MacIlwraith, McEacharn & Co. ..	300, **600**	—	—	—	—
Katoomba	VHN	Day, 250; night, 800	MacIlwraith, McEacharn & Co. ..	300, **600**	—	—	—	—
Kulambangra	VHA	Day, 300; night, 700	Lever's Pacific Plantations ..	—	—	—	—	—
Kyarra	VHC	Day, 200; night, 800	—	300, **600**	—	—	—	—
Levuka	VHB	Day, 200; night, 800	—	300, **600**	—	—	—	—
Mataram	VHU	—	Burns, Philp & Co.	300, **600**	—	—	—	—
Matunga	VHV	—	Burns, Philp & Co.	300, **600**	—	—	—	—
Melbourne, VKC	VKC	—	Government	**600**	O	—	—	—
Montoro	VHT	—	Burns, Philp & Co.	300, **600**	—	—	—	—
Morinda	VJF	—	Burns, Philp & Co.	300, **600**	—	—	—	—
Navy Office	VKN	—	Government	**600**	O	—	—	—
Parramatta	VKJ	—	Government	**600**	O	—	—	—
Pioneer, VKF	VKF	—	Government	**600**	O	—	—	—
Port Stevens base	VKS	—	Government	**600**	O	—	—	—
Protector	VKG	—	Government	**600**	O	—	—	—
Riverina	VJA	Day, 300; night, 700	Huddart Parker, Ltd.	—	—	—	—	—
St. Albans	VJD	Day, 300; [illegible]	Eastern and Australian S.S. Co. ..	—	—	—	—	—

Warrego	VKH	—	Government	600	O ..	..	—	—	—
Western Australia	VHK	Day, 400; night, 700	Government	300, 600	—		—	—	—
Westralia	VJB	Day, 300; night, 700	Huddart Parker, Ltd.	—	—		—	—	—
Willochra	VHG	Day, 200; night, 800	Adelaide S.S. Co.	300, 600	—		—	—	—
Wimmera	VHZ	Day, 300; night, 700	Huddart Parker, Ltd.	—	—		—	—	—
Wyandra	VHW	Day, 300; night, 700	Australasian United S. N. Co.	—	—		—	—	—
Wyreena	VJG	Day, 300; night, 700	Australasian United S. N. Co.	—	—		—	—	—
Yarra	VKI	—	Government	600	O ..	..	—	—	—
Zealandia	VJC	Day, 300; night, 700	Huddart Parker, Ltd.	300, 600	—		—	—	—
AUSTRIA									
Africa, OLA [17]	OLA	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft vormals Austro-Americana und Fratelli Cosulich	300, 450, 600	P G	..	X	0.30	3.00
Alice [18]	OKI	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	N [2] X [3]	0.30	3.00
Argentina [18]	OKG	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	N [2] X [3]	0.30	3.00
Atlanta [18]	OKA	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	N [2] X [3]	0.30	3.00
Austria [17]	OLU	Day, 150; night, 250	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	X	0.30	3.00
Bohemia [17]	OLB	Day, 150; night, 250	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	X	0.30	3.00
China, OLC [17]	OLC	Day, 150; night, 250	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	X	0.30	3.00
Cleopatra [17]	OLL	Day, 150; night, 250	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	X	0.30	3.00
Columbia, OKC [18]	OKC	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	N [2] X [3]	0.30	3.00
Belvedere [18]	OKB	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft	300, 450, 600	P G	..	N [2] X [3]	0.30	3.00
Erzherzog Franz Ferdinand, OLE [17]	OLE	Day, 150; night, 250	Austrian Lloyd	300, 450, 600	P G	..	X	0.30	3.00
Eugenia [18]	OKE	Day, 400; night, 700	Vereinigte Osterreichische Schiffahrts-Aktiengesellschaft	300, 600	P G	..	N [2] X [3]	0.30	3.00
Francesca [18]	OKF	Day, 400; night, 700	Ver. Ost. Schiffarts A.G. ..	300, 450, 600	P G	..	N [2] X [3]	0.30	3.00
Gablonz [19]	OLG	Day, 400; night, 700	Austrian Lloyd	300, 450, 600	P G	..	X	0.30	3.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
AUSTRIA—*contd.*							Francs.	Francs.
Habsburg, OLR [1, 7]	OLR	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Helouan [1, 6]	OLH	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Kaiser Franz Joseph I., OKK [1, 8]	OKK	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts Aktiengesellschaft	300, 450, **600**	P G ..	N	0.30	3.00
Körber [1, 7]	OLK	Day, 400; night, 700	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Laura [1, 8]	OKL	Day, 400; night, 700	Ver. Ost. Schiffahrts A.G. ..	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Marienbad [1, 7]	OLM	Day, 400; night, 700	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Martha Washington [1, 8] ..	OKM	Day, 400; night, 700	Ver. Ost. Schiffahrts A.G. ..	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Mercédès II. [4]	OMA	Day, 150; night, 250	M. E. Jellinek Mercédès	300	P	X	—	—
Nippon [1, 7]	OLN	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Oceania [1, 8]	OKO	Day, 400; night, 700	Ver. Ost. Schiffahrts A.G. ..	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Persia, OLP [1, 7]	OLP	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Semiramis [1]	OLS	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Silesia [1]	OLJ	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Sofia Hohenberg [1]	OKH	Day, 400; night, 700	Ver. Ost. Schiffahrts A.G. ..	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Thalia	OLI	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Trieste [1]	OLT	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Vorwärts [1]	OLV	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00
Wien, OLW [1]	OLW	Day, 150; night, 250	Austrian Lloyd	300, 450, **600**	P G ..	X	0.30	3.00

[illegible]	UOV	—	Warship	[illegible]	O	N	—	—
Budapest	UPB	—	Warship	300, 600	O	N	—	—
Csepel	UPL	—	Warship	300, 600	O	N	—	—
Csikós	UPO	—	Warship	300, 600	O	N	—	—
Dinara	UPR	—	Warship	300, 600	O	N	—	—
Erzherzog Ferdinand Max	UPZ	—	Warship	600	O	N	—	—
Erzherzog Franz Ferdinand, UPW	UPW	—	Warship	600	O	N	—	—
Erzherzog Friedrich	UQF	—	Warship	600	O	N	—	—
Erzherzog Karl	UQK	—	Warship	600	O	N	—	—
Gäa	UQX	—	Warship	600	O	N	—	—
Habsburg, URN	URN	—	Warship	600	O	N	—	—
Helgoland, URM	URM	—	Warship	600	O	N	—	—
Herkules	URR	—	Warship	300, 600	O	N	—	—
Huszar	URU	—	Warship	300, 600	O	N	—	—
Kaiser Franz Joseph I., USJ	USJ	—	Warship	600	O	N	—	—
Kaiserin Elisabeth	USN	—	Warship	600	O	N	—	—
Kaiserin und Königin Maria Theresia	USQ	—	Warship	600	O	N	—	—
Kaiser Karl VI.	USC	—	Warship	600	O	N	—	—
Lacroma	USW	—	Warship	300, 600	O	N	—	—
Lika	USY	—	Warship	300, 600	O	N	—	—
Lussin	UTC	—	Warship	—	—	—	—	—
Miramar	UTM	—	Warship	300, 600	O	N	—	—
Monarch, UTO	UTO	—	Warship	300, 600	O	N	—	—
Novara, UTV	UTV	—	Warship	600	O	N	—	—
Orjen	UTX	—	Warship	300, 600	O	N	—	—
Pandur	UUB	—	Warship	300, 600	O	N	—	—
Panther, UUD	UUD	—	Warship	300, 600	O	N	—	—
Pelikan, UUK	UUK	—	Warship	300, 600	O	N	—	—
Prinz Eugen	UUN	—	Warship	600	O	N	—	—
Radetzky	UUS	—	Warship	600	O	N	—	—
Réka	UUW	—	Warship	300, 600	O	N	—	—
Saida	UVA	—	Warship	600	O	N	—	—
Scharfschütze	UVH	—	Warship	300, 600	O	N	—	—
S. Georg	UVG	—	Warship	600	O	N	—	—
Streiter	UVJ	—	Warship	300, 600	O	N	—	—
Szigetvár	UVO	—	Warship	600	O	N	—	—
Tátra	UVW	—	Warship	300, 600	O	N	—	—
Taurus	UVY	—	Warship	300, 600	O	N	—	—
Tegetthoff	UWB	—	Warship	600	O	N	—	—
Temes	UWH	—	Warship	—	—	—	—	—
Triglav	UWL	—	Warship	300, 600	O	N	—	—
Turul	UWP	—	Warship	300, 600	O	N	—	—
Ulan	UWU	—	Warship	300, 600	O	N	—	—
Uskoke	UWZ	—	Warship	300, 600	O	N	—	—
Velebit	UXL	—	Warship	300, 600	O	N	—	—
Vesta	UXS	—	Warship	—	O	N	—	—
Viribus unitis	UXV	—	Warship	600	O	N	—	—
Wien, UYA	UYA	—	Warship	300, 600	O	N	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
AUSTRIA-HUNGARY—*contd.*							Francs.	Francs.
Wildfang	UYF	—	Warship	300, **600**	O	N	—	—
Zenta	UYT	—	Warship	600	O	N	—	—
Zrinyi	UYY	—	Warship	600	O	N	—	—
BATAVIA								
Houtman	PMC	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
Melchior Treub	PMD	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
Rumphins	PME	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
Tasman	PMF	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
Van Cloon	PMA	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
Van Lansberghe	PMG	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
Van Overstaaten	PMB	—	Koninklijke Packetvaart Maatschappij	300, **600**	P G ..	—	0.40	4.00
BELGIUM								
Albertville [11]	OTV	170	Cie Belge Maritime du Congo ..	300, 450, **600**	P G ..	N	0.40	4.00
Anversville	ONV	170	Cie Belge Maritime du Congo ..	300, 450, **600**	P G ..	N	0.40	4.00
Avenir (L') [11]	ONE	170	Association Maritime Belge ..	300, 450, **600**	P G ..	N	0.40	4.00
Elisabethville [11]	OSV	170	Cie Belge Maritime du Congo ..	300, 450, **600**	P G ..	N	0.40	4.00
Gothland	ORG	—	Red Star Line	—	—	—	0.40	4.00
Jan Breydel	ONJ	60	Government	300	P R [13] ..	— [14]	—	—
Lapland [11]	ORL	170	Red Star Line	120, 300, **600**	P G ..	N	0.40	4.00
Leda, OSY [11]	OSY	75–150	G. L. Carels (Ghent)	300, 450, **600**	P	X	—	—
Léopold II. [10]	OPD	60	Government	300	P R [13] ..	— [14]	— [15]	—
Léopoldville [11]	OPV	170	Cie Belge Maritime du Congo ..	300, 450, **600**	P G ..	N	0.40	4.00
[illegible] Henriette [10]	ONM	60	Government	300	P R [13] ..	— [14]	— [15]	—
[illegible] [11]	[illegible]	60	Government	[illegible]	P R [13] ..	— [14]	— [15]	—

Vaderland [11]	ORD	170	Red Star Line	120, 300, 600	P G	N	0.40	4.00
Zeeland, ORZ [11]	ORZ	170	Red Star Line	300, 450, 600	P G	N	0.40	4.00
BRAZIL								
Acre	SRF	—	Government	—	—	—	—	—
Alagoas	ALG	50	Warship	300	O	N	—	—
Amazonas	AMO	50	Warship	300	O	—	—	—
Andrada	ADD	80	Warship	300	O	—	—	—
Aymore	SRJ	—	Government	—	—	—	—	—
Bahia	BHI	110	Warship	400–1,200	O	N	—	—
Bahia	SRE	—	Government	—	—	—	—	—
Barroso	BRS	—	Warship	300	O	—	—	—
Benjamin Constant	BCC	50	Warship	300	O	—	—	—
Brazil	SRM	—	Government	—	—	—	—	—
Carioca	SOW	—	Government	—	—	—	—	—
Carlos Gomes	CGB	80	Warship	300	O	N	—	—
Ceara	SRD	—	Government	—	—	—	—	—
Deodoro	DRO	40	Warship	300	O	—	—	—
Floriano	FNO	40	Warship	300	O	—	—	—
Iris	SRU	—	Government	—	—	—	—	—
Itagiba	STF	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—
Itapuhy	STD	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—
Itapura	STA	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—
Itaquera	STE	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—
Itassuce	STC	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—
Itatinga	STB	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—
Javary	SRY	—	Government	—	—	—	—	—
Jupiter	SRT	—	Government	—	—	—	—	—
Ladario	SRN	—	Government	—	—	—	—	—
Manaos	SRS	—	Government	—	—	—	—	—
Maranhao	SRK	—	Government	—	—	—	—	—
Matto Grosso	MST	50	Warship	300	O	—	—	—
Mercédès	SRO	—	Government	—	—	—	—	—
Minas Geraes	MIG	270	Warship	300–2,100	O	N	—	—
Minas Geraes	SRB	—	Government	—	—	—	—	—
Olinda	SRL	—	Government	—	—	—	—	—
Orion	SRI	—	Government	—	—	—	—	—
Oyapock	SRX	—	Government	—	—	—	—	—
Pará	PAR	50	Warship	300	O	—	—	—
Pará	SRQ	—	Government	—	—	—	—	—
Parahyba	PHY	50	Warship	300	O	—	—	—
Paraná, PRN	PRN	—	Warship	—	O	—	—	—
Piauhy	PYH	50	Warship	300	O	—	—	—
Prudente	SRV	—	Lloyd Brazileiro	—	—	—	—	—
Republica	RBP	40	Warship	300	O	—	—	—
Rio de Janeiro	SRA	—	Government	—	—	—	—	—
Rio Grande do Norte	RVG	50	Warship	300	O	N	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
BRAZIL—*contd.*							Francs.	Francs.
Rio Grande do Sul	RSG	110	Warship	400–1,200	O	N	—	—
S. Paulo	SRC	—	Government	—	—	—	—	—
St. Catharina	SCN	50	Warship	300	O	N	—	—
Satellite	SRG	—	Government	—	—	—	—	—
Saturno	SRR	—	Government	—	—	—	—	—
Sergipe	SGP	—	Warship	—	O	—	—	—
Sergipe	SRH	—	Government	—	—	—	—	—
Sirio	SRW	—	Government	—	—	—	—	—
Tamandaré	TRE	50	Warship	300	O	—	—	—
Tamoyo	TAM	—	Warship	300	O	—	—	—
Tiradentes	TSD	16	Warship	300	O	—	—	—
Tupy	TPY	25	Warship	300	O	—	—	—
Tymbira	TYB	25	Warship	300	O	—	—	—
Venus	SRP	—	Government	—	—	—	—	—
BRITISH INDIA								
Dufferin	VUB	250	Government	**300**, 600, 1,000	P G	N	0.40	—
Hardinge	VUC	250	Government	**300**, 600, 1,000	P G	N	0.40	—
CANADA								
Aberdeen[16]	VDG	100	Government	300	O	N	—	—
Adventure	VOK	—	Harvey & Co.	—	—	—	—	—
Alberta[17]	VFQ	200	C.P.R.	300, **600**	P G	N	0.20	2.00
Algerine	VOL	—	—	—	—	—	—	—
Aquilo	VFU	80	B. J. Rogers, Vancouver	300	P	X	—	—
Aranmore[17]	VFY	200	Holliday Bros.	300, **600**	P G	N	0.40	4.00
Arcadia	—	100	—	300, **600**	—	—	—	—
Assiniboia[17]	VGI	200	C.P.R.	300, **600**	P G	N	0.20	2.00
Athabasca[17]	VGG	200	C.P.R.	300, **600**	P G	N	0.20	2.00
A. W. Perry[17]	VFW	200	Canada Atlantic & Plant Line	300	P G	N	0.40	4.00
Bellaventure	VOM	200	Harvey & Co.	300, [illegible]	—	—	0.40	—

City of Sydney ..	VFO	200	St. Laurence Shpg. Co.	300, 600	P G	N	0.40	4.00
Dollard[16]	VDO	150	Government	300	O ..	—[19]	—	—
Douglas H. Thomas	VGR	—	Omnium Coal Co.	—	—	—	—	—
Druid VDH[16]	VDH	100	Government	300	O ..	N	—	—
Eagle ..	VOU	—	Bowring Bros.	—	—	—	—	—
Earl Grey[16]	VDI	200	Government	300	O ..	N	—	—
Empire[17]	VFP	200	Canadian Towing & Wrecking Co.	300, 600	P G	N	0.20	2.00
Estevan[18]	VDN	200	Government	300, 600	O ..	—[18]	—	—
Evangeline	VGO	250	Canada Atlantic & Plant Line ..	300, 600	P G	N	0.40	4.00
Florence	VFT	200	T. Eaton, Toronto	300	P ..	X	—	—
Galiano	—	100	—	300, 600	—	—	—	—
Halifax	VGP	250	Canada Atlantic & Plant Line ..	300, 600	P G	N	0.40	4.00
Hamonic[17]	VGD	200	Northern Navigation Co.	300, 600	P G	N	0.20	2.00
Huronic[17]	VGE	200	Northern Navigation Co.	300, 600	P G	N	0.20	2.00
Invermore	VOQ	—	Reid Newfoundland Co. ..	300	—	—	—	—
Keewatin[17]	VGC	200	C.P.R.	300, 600	P G	N	0.20	2.00
Kyle ..	VOR	—	Reid Newfoundland Co. ..	300	—	—	—	—
Lady Grey[18]	VDL	100	Government	300	O ..	—[19]	—	—
Lady Laurier[16]	VDF	150	Government	300	O ..	N	—	—
Lintrose	VOS	—	Reid Newfoundland Co. ..	300	—	—	—	—
Lord Strathcona[17]	VFX	80	Quebec Salvage & Wrecking Co...	300	P G	X	0.40	4.00
Lorne ..	—	—	Vancouver Tugboat Co. ..	—	—	—	—	—
Lurcher, Lightship	VDR	100	Government	300, 600	—	—	—	—
Malespena	—	150	—	300, 600	—	—	—	—
Manitoba[17]	VGH	200	C.P.R.	300, 600	P G	N	0.20	2.00
Margaret	—	150	—	300, 600	—	—	—	—
Meigle ..	VOV	—	—	—	—	—	—	—
Minto[16] ..	VDD	150	Government	300	O ..	N	—	—
Montcalm VDJ[16]	VDJ	150	Government	300	O ..	N	—	—
Montmagny[18]	VDK	200	Government	300	O ..	—[19]	—	—
Morwenna[17]	VFN	200	St. Laurence Shipping Co.	300, 600	P G	N	0.40	4.00
Nascopie	VOT	200	Job Bros.	300, 600	—	—	—	—
Neptune	VOX	—	Job Bros.	—	—	—	—	—
Newfoundland	VOW	—	Harvey & Co.	—	—	—	—	—
Newington[18]	VDP	100	Government	300	O ..	—[19]	—	—
Niobe VDA[16]	VDA	—	Government	—	O ..	—	—	—
Noronic	VGW	200	Northern Navigation Co.	300, 600	P G	N	0.20	2.00
Oceana ..	—	—	Bermuda Atlantic S.S. Co.	—	—	—	—	—
Prince Albert ..	VFL	200	Grand Trunk S.S. Co. ..	300	P G	X	0.40	4.00
Prince Arthur[17]	VGJ	200	Boston & Yarmouth S.S. Co.	300, 600	P G	N	0.40	4.00
Prince George VGK[17]	VGK	200	Boston & Yarmouth S.S. Co.	300, 600	P G	N	0.40	4.00
Prince John ..	VFM	200	Grand Trunk S.S. Co. ..	300	P G	X	0.40	4.00
Princess Adelaide[17]	VFA	250	C.P.R.	300, 600	P G	N	0.40	4.00
Princess Alice VFD[17]	VFD	200	C.P.R.	300	P G	N	0.40	4.00
Princess Beatrice[17]	VFC	200	C.P.R.	300, 600	P G	N	0.40	4.00
Princess Charlotte[17]	VFE	250	C.P.R.	300, 600	P G	N	0.40	4.00
Princess Ena[17]	VFJ	200	C.P.R.	300, 600	P G	N	0.40	4.00
Princess Maquinna	VGT	250	C.P.R.	300, 600	P G	N	0.40	4.00
Princess Mary[17]	VFB	250	C.P.R.	300, 600	P G	N	0.40	4.00
Princess May[17]	VFH	200	C.P.R.	300	P G	N	0.40	4.00

Ship Stations—*Continued*

Name	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
CANADA—*contd*								
							Francs.	Francs.
Princess Royal VFG[17] ..	VFG	200	Canadian Pacific Railway ..	300	P G ..	N	0.40	4.00
Princess Sophia[17]	VFI	200	Canadian Pacific Railway ..	300, **600**	P G ..	N	0.40	4.00
Province[17]	VFR	200	Canadian Towing & Wrecking Co.	300, **600**	P G ..	N	0.20	2.00
Quadra[16]	VDM	100	Government	300	O	N	—	—
Rainbow VDB[16]	VDB	—	Government	—	O	—	—	—
Robert Dollar	VGM	—	Robert Dollar Co., Vancouver ..	**300**, 600	—	—	—	—
Royal Edward[17]	VGB	300	Canadian Northern	300, **600**	P G ..	N	0.40	4.00
Royal George[17]	VGA	300	Canadian Northern	300, **600**	P G ..	N	0.40	4.00
Salvor	VFV	200	B.C. Salvage Co.	300	P	X	—	—
Saronic[17]	VGF	200	Northern Navigation Co. ..	300, **600**	P G ..	N	0.20	2.00
Seal	VGV	250	Halifax Trading & Sealing Co. ..	300, **600**	—	—	—	—
Simcoe	VDS	100	Government	300, **600**	—	—	—	—
Solgar (Yacht)	VGS	200	G. P. Grant	**300**, 600	—	—	—	—
St. Ignace	VGL	200	Canadian Towing & Wrecking Co.	300, **600**	—	—	0.20	2.00
Stanley[16]	VDE	150	Government	300	O	N	—	—
Strathcona	—	—	R.N. Mission to Deep Sea Fishermen	—	—	—	—	—
Tees[17]	VFK	150	C.P.R.	300	P G ..	8 a.m. to 8 p.m.	0.40	4.00
CHILI								
Aysen	CAA	250	Compania Sud-Americana de Vapores	300, **600**	P G ..	N	0.40	—
Baquedano	CBQ	—	Warship	—	—	—	—	—
Blanco	CBB	—	Warship	—	O	—	—	—
Casma	CBK	—	Warship	—	O	—	—	—
Chacabuco	CBA	—	Warship	—	O	—	—	—
Cochrane, CBC..	CBC	—	Warship	—	O	—	—	—
Condell	CBD	—	Warship	—	O	—	—	—
Errazuriz	CBI	—	Warship	—	O	—	—	—
Esmeralda	CBE	—	Warship	—	O	—	—	—
Ex-Cochrane	CBX	—	Warship	—	O	—	—	—
Gamero	CBG	—	Warship	—	O	—	—	—
Huasco	CAH	250	Compania Sud-A. de Vapores ..	300, **600**	P G ..	N	0.40	—
Imperial	CAI	250	Compania Sud-A. de Vapores ..	300, **600**	P G ..	N	0.40	—
Jorpa	CBJ	—	.. ..	—	O	—	—	—
Latorre	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	—	—

[illegible]	CHN	—	Warship	—	O	—	—	—
O'Higgins	CBH	—	Warship	—	O	—	—	—
Orella	CBO	—	Warship	—	O	—	—	—
Palena	CAP	250	Compania Sud-A. de Vapores	300, **600**	P G	N	0.40	—
Prat	CBP	—	Warship	—	O	—	—	—
Rancagua	CBW	—	Warship	—	O	—	—	—
Riquelme	CBR	—	Warship	—	O	—	—	—
Serrano	CBS	—	Warship	—	O	—	—	—
Talcahuano	CBF	—	Warship	—	O	—	—	—
Thompson	CBT	—	Warship	—	O	—	—	—
Tomé	CBM	—	Warship	—	O	—	—	—
Zenteno	CBZ	—	Warship	—	O	—	—	—
CUBA								
Antilla	—	—	Cia Cubana di Nav.	300, **600**	P G	—	0.20	2.00
Camaguey	—	—	Cia Cubana di Nav.	300, **600**	P G	—	0.20	2.00
Guantanamo	—	—	Cia Cubana di Nav.	300, **600**	P G	—	0.20	2.00
Olinda	—	—	Munson S.S. Lines	300, **600**	P G	—	0.20	2.00
Santiago	—	—	Cia Cubana di Nav.	300, **600**	P G	—	0.20	2.00
DENMARK								
Absalon	OUA	—	Warship	600	O [22]	X	—	—
C. F. Grove [20]	OUO	100	Government	600	P G	7(8) a.m., 11 a.m., 3 p.m., 7 p.m.	—[22]	—[22]
Dannebrog	OUD	—	Warship	600	O [22]	X	—	—
Flyvefisken	OVF	—	Warship	600	O [22]	X	—	—
Frederick VIII	OZL	200	Det Forenede Dampskibsselskab Co.	—	P G	N	0.40	4.00
Gejser	OUG	—	Warship	600	O [22]	X	—	—
Hejmdal	OUJ	—	Warship	600	O [22]	X	—	—
Hellig Olav [21]	OZB	200	Det Forenede Dampskibsselskab Co	600	P G	N	0.40	4.00
Herluf Trolle	OUH	—	Warship	600	O [22]	X	—	—
Islands Falk	OUI	—	Warship	600	O [22]	X	—	—
Jutlandia	OZG	250	Det Ostasiatiske Co.	600	P G	X	0.35	—
Köbenhavn	OZE	150	Dampskibsselskabet Köbenhavn Co.	600	P G	N	0.40	4.00
Lossen	OUL	—	Warship	600	O [22]	X	—	—
Lövenörn [21]	OUN	100	Government	600	P G	7.30 a.m., 11.30 a.m., 3.30 p.m., 7.30 p.m.	—[22]	—[22]
Olfert Fischer	OUF	—	Warship	600	O [22]	X	—	—
Oscar II., OZC [21]	OZC	200	Det Forenede Dampskibsselskab Co.	600	P G	N	0.40	4.00
Peder Skram	OUP	—	Warship	600	O [22]	X	—	—
Selandia	OZF	250	Det Ostasiatiske Co.	600	P G	X	0.35	—
Skjold	OUS	—	Warship	600	O [22]	X	—	—
Söridderen	OVR	—	Warship	600	O [22]	X	—	—
Söulven	OVU	—	Warship	600	O [22]	X	—	—
Spækhuggeren	OVS	—	Warship	600	O [22]	X	—	—
Tumleren	OVT	—	Warship	600	O [22]	X	—	—
United States [21]	OZD	200	Det Forenede Dampskibsselskab Co.	600	P G	N	0.40	4.00

Ship Stations—*Continued*

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DENMARK—*contd.*							Francs.	Francs.
Valkyrien, OUV	OUV	—	Warship	600	O [33] ..	X	—	—
Viking, OZH	OZH	Day, 160; night, 320	Em. Z. Svitzers Bjergnings-Entreprise	600	P ..	X	0.40	4.00
Vindhunden	OVV	—	Warship	600	O [33] ..	X	—	—
DUTCH EAST INDIES								
Telegraaf [34]	PLA	380	Government	300, **600**, 900	O	—	—	—
EGYPT								
Mahroussa	SUA	350	Khedivial Yacht	300, **600**	P	—	—	—
FRANCE								
Abda	—	—	Cie de Nav. Paquet	—	—	—	—	—
Abd-el-Kader [33]	FGK	160	Cie Générale Transatlantique ..	300, **600**	P G ..	N	0.40	—
Afrique	FCR	Day, 270; night, 1080	Cie des Chargeurs Réunis.. ..	300, **600**	P G ..	—	0.40	—
Algérie	FVA	270	Société Generale de Transports Maritimes à Vapeur	300, **600**	P G ..	N	0.40	—
Amazone, FMA	FMA	Day, 325; night, 650	Cie des Messageries Maritimes ..	300, **600**	P G ..	6 a.m. to 10 a.m., 5 p.m. to 7 p.m., 9 p.m. to 12 p.m.	0.40	—
Amiral Aube	UCJ	350	Warship	300, **600**	P G ..	N	0.05	—
Amiral Charner	UID	350	Warship	300, **600**	P G ..	N	0.05	—
Amiral Jaureguiberry.. ..	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Amiral Rigault de Genouilly [33]	FCG	160	Cie des Chargeurs Réunis.. ..	300, **600**	P G ..	N	0.40	—
Amiral Sallandronze de Lamornaix	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Amiral Trehouart	ULT	100	Warship	300	P G ..	N	0.05	—
Amiral Troude..	FCT	—	Cie Chargeurs Réunis	—	—	—	—	—
Amiral Villaret de Joyeuse ..	[illegible]	—	Cie Chargeurs Réunis	—	—	—	—	—
Amiral Ze[illegible]	[illegible]	[illegible]	[illegible] Réunis	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	UDT	80	Warship	300	P G	N	0.05	—
Arc	UEA	80	Warship	300	P G	N	0.05	—
Argus	UKC	50	Warship	300	P G	N	0.05	—
Arquebuse	UDM	80	Warship	300	P G	N	0.05	—
Aspirant-Herber	UFZ	80	Warship	300	P G	N	0.05	—
Atlantique [25]	FMT	Day, 270; night, 650	Cie des Messageries Maritimes	300, 600	P G	N	0.40	—
Atlas, ULA	ULA	50	Warship	300	P G	N	0.05	—
Atmah (yacht)	FYA	Day, 540; night, 1,350	Baron E. de Rothschild	300, 600	P G	N	—	—
Bacchante, FYB (yacht)	FYB	160	Henri Menier, Paris	300, 600	P G	N	—	—
Baliste	UDY	80	Warship	300	P G	N	0.05	—
Belier	UEC	80	Warship	300	P G	N	0.05	—
Bien Hoa	UJA	150	Warship	300, 600	P G	N	0.05	—
Bisson	UGK	80	Warship	300	P G	N	0.05	—
Bombarde	UEG	80	Warship	300	P G	N	0.05	—
Borda	UJK	350	Warship	300, 600	P G	N	0.05	—
Bouclier	UFV	80	Warship	300	P G	N	0.05	—
Bougainville	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Boutefeu	UGC	80	Warship	300	P G	N	0.05	—
Bouvet	UAP	350	Warship	300, 600	P G	N	0.05	—
Bouvines	ULB	150	Warship	300, 600	P G	N	0.05	—
Branlebas	UEY	80	Warship	300	P G	N	0.05	—
Brennus	UAX	350	Warship	300, 600	P G	N	0.05	—
Bretagne	FSB	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P G	N	0.40	—
Bruix	UIE	350	Warship	300, 600	P G	N	0.05	—
Buffle	ULD	50	Warship	300	P G	N	0.05	—
Burdigala	FSU	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P G	N	0.40	—
Californie [25]	FTK	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—
Canada, FJC [25]	FJC	160	Cie Cyprien Fabre et Cie	300, 600	P G	N	0.40	—
Capitaine Mehl	UGJ	80	Warship	300	P G	N	0.05	—
Carabine	UDR	80	Warship	300	P G	N	0.05	—
Carabinier	UFH	80	Warship	300	P G	N	0.05	—
Caravelle [25]	FTC	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—
Carnot	UAT	350	Warship	300, 600	P G	N	0.05	—
Caroline [25]	FTO	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—
Carquois	UEP	80	Warship	300	P G	N	0.05	—
Carthage [25] [26]	FGC	160	Cie Gén. Transatlantique	300, 600	P G	N	0.10	—
Casabianca	UHC	150	Warship	300, 600	P G	N	0.05	—
Casque	UFT	80	Warship	300	P G	N	0.05	—
Cassard	UIK	150	Warship	300, 600	P G	N	0.05	—
Cassini	UHD	150	Warship	300, 600	P G	N	0.05	—
Catapulte	UED	80	Warship	300	P G	N	0.05	—
Caudan	ULE	50	Warship	300	P G	N	0.05	—
Cavalier	UFP	80	Warship	300	P G	N	0.05	—
Centaure	ULC	50	Warship	300	P G	N	0.05	—
Cerbère	UHB	150	Warship	300, 600	P G	N	0.05	—
Ceylan	FGG	—	Cie Chargeurs Réunis	—	—	—	—	—

Ship Stations—*Continued*

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FRANCE—*cont.*							Francs.	Francs.
Champagne [25]	FTA	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Champlain	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Chaouia	FPC	160	N. Paquet et Cie	300, **600**	P G	N	0.40	—
Charlemagne	UAQ	350	Warship	300, **600**	P G	N	0.05	—
Charles Martel	UAV	350	Warship	300, **600**	P G	N	0.05	—
Charles Roux [25 26]	FGR	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.10	—
Charlotte	FHO	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, **600**	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Chasseur	UFG	80	Warship	300	P G	N	0.05	—
Châteaurenault	UCW	350	Warship	300, **600**	P G	N	0.05	—
Chicago, FTI [25]	FTI	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Chili	FMC	270	Cie des Messageries Maritimes	300, **600**	P G	N	0.40	—
Cimeterre	UGA	80	Warship	300	P G	N	0.05	—
Claymore	UEJ	80	Warship	300	P G	N	0.05	—
Cognée	UFA	80	Warship	300	P G	N	0.05	—
Commandant Bory	UGD	80	Warship	300	P G	N	0.05	—
Commandant Lucas	UGP	80	Warship	300	P G	N	0.05	—
Commandant Riviere	UGE	80	Warship	300	P G	N	0.05	—
Condé	UCK	350	Warship	300, **600**	P G	N	0.05	—
Condorcet	UAG	350	Warship	300, **600**	P G	N	0.05	—
Corsica	—	—	Cie Fraissinet	—	—	—	—	—
Corsica [25 27]	FRC	160	Cie Marseillaise de Nav. à Vapeur	300, **600**	P G	N	0.10	—
Corte II.	FRR	—	Cie Fraissinet	—	—	—	—	—
Cosmao	UIR	150	Warship	300, **600**	P G	N	0.05	—
Courbet	UAZ	150	Warship	300, **600**	P G	N	0.05	—
Coutelas	UES	80	Warship	300	P G	N	0.05	—
Cyclope	ULI	50	Warship	300	P G	N	0.05	—
Dague	UFY	80	Warship	300	P G	N	0.05	—
Danton	UAB	350	Warship	300, **600**	P G	N	0.05	—
Dard	UDX	80	Warship	300	P G	N	0.05	—
Décidée	UIZ	200	Warship	300, **600**	P G	N	0.05	—
Dehorter	UGH	80	Warship	300	P G	N	0.05	—
Démocratie	UAK	350	Warship	300, **600**	P G	N	0.05	—
d'Entrecasteaux	UIG	350	Warship	300, **600**	P G	N	0.05	—
Desaix	[illegible]	350	Warship	300, **600**	P G	N	0.05	—
Descartes	[illegible]	[illegible]	Warship	300, **600**	P G	N	[illegible]	—

Divona	FSD	Day, 270; night, 1,080	Cie de Nav. Sud Atlantique ..	300, 600	P G ..	—	—	—
Djurjura [25]	FXD	160	Cie de Nav. Mixte	300, 600	P G ..	N	0.10	—
Doudart de Lagrée	UKD	50	Warship	300	P G ..	N	0.05	—
Doukkala	—	—	Cie de Nav. Paquet	—	—	—	—	—
Drôme	UJE	150	Warship	300, 600	P G ..	N	0.05	—
Duc d'Aumale [25 29]	FGD	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.10	—
Duc de Bragance [25 29] ..	FGG	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.10	—
du Chavla	UIJ	150	Warship	300, 600	P G ..	N	0.05	—
Duguay Trouin	UJC	350	Warship	300, 600	P G ..	N	0.05	—
Dunois	UIT	80	Warship	300	P G ..	N	0.05	—
Dupetit Thouars	UCN	350	Warship	300, 600	P G ..	N	0.05	—
Dupleix..	—	—	Cie Chargeurs Reunis	—	—	—	—	—
Dupleix	UCS	350	Warship	300, 600	P G ..	N	0.05	—
Durandal	UDA	80	Warship	300	P G ..	N	0.05	—
Edgar Quinet	UCB	350	Warship	300, 600	P G ..	N	0.05	—
Emma	FHE	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, 600	P G ..	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Enseigne Henry	UFX	80	Warship	300	P G ..	N	0.05	—
Epée	UDG	80	Warship	300	P G ..	N	0.05	—
Epieu	UDW	80	Warship	300	P G ..	N	0.05	—
Ernest Renau	UCD	350	Warship	300, 600	P G ..	N	0.05	—
Eros	FYS	160	Henri de Rothschild	300	P G ..	N	—	—
Escopette	UDJ	80	Warship	300	P G ..	N	0.05	—
Espagne, FAE	FAE	160	Cie de Nav. France-Amerique ..	300	P G ..	N	0.40	—
Espagne, FTE [25]	FTE	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Estafette	ULM	50	Warship	300	P G ..	N	0.05	—
Etendard	UFD	80	Warship	300	P G ..	N	0.05	—
Eugène Péreire [24 29]	FGP	160	Cie Gén. Transatlantique.. ..	300	P G ..	N	0.10	—
Europe	FCU	Day, 270; night, 1,080	Cie Gén. des Chargeurs Réunis ..	300, 600	P G ..	— [27]	0.40	—
Fanfare	UEZ	80	Warship	300	P G ..	N	0.05	—
Fanion	UFE	80	Warship	300	P G ..	N	0.05	—
Fantassin	UFO	80	Warship	300	P G ..	N	0.05	—
Fauconneau	UDC	80	Warship	300	P G ..	N	0.05	—
Faulx	UGB	80	Warship	300	P G ..	N	0.05	—
Flamberge	UDL	80	Warship	300	P G ..	N	0.05	—
Flanche	—	—	Cie Gén. Transatlanique	—	—	—	—	—
Fleuret	UER	80	Warship	300	P G ..	N	0.05	—
Floride [25]	FTF	160	Cie Gén Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Forbin	UIP	150	Warship	300, 600	P G ..	N	0.05	—
Formosa	FVO	270	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P G ..	N	0.40	—
Foudre	UIM	350	Warship	300, 600	P G ..	N	0.05	—
Fourche	UFW	80	Warship	300	P G ..	N	0.05	—
France, FTZ [25]	FTZ	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
France, FVF	FVF	270	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P G ..	N	0.40	—
Francis Garnier	UGI	80	Warship	300	P G ..	N	0.05	—
Francisque	UFH	80	Warship	300	P G ..	N	0.05	—
Friant	UIL	150	Warship	300, 600	P G ..	N	0.05	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Fronde	UDQ	80	Warship	300	P G	N	0.05	—
Furieux	ULF	150	Warship	300, **600**	P G	N	0.05	—
Gabion	UEX	80	Warship	300	P G	N	0.05	—
Garonna	FSG	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, **600**	P G	N	0.40	—
Garonne	UJH	150	Warship	300, **600**	P G	N	0.05	—
Gascogne	FSC	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, **600**	P G	N	0.40	—
Gaulois	UAR	350	Warship	300, **600**	P G	N	0.05	—
Germania [25]	FJG	160	Cyprien Fabre et Cie	300, **600**	P G	N	0.40	—
Glaive	UFI	80	Warship	300	P G	N	0.05	—
Gloire	UCL	350	Warship	300, **600**	P G	N	0.05	—
Goliath, ULG	ULG	50	Warship	300	P G	N	0.05	—
Golo	—	—	Cie Fraissinet	—	—	—	—	—
Golo [25 27]	FRO	160	Cie Marseillaise de Nav. à Vapeur	300, **600**	P G	N	0.10	—
Guadeloupe [25]	FTG	160	Cie. Gén. Transatlantique	300, **600**	P G	N	0.40	—
Gueydon	UCP	350	Warship	300, **600**	P G	N	0.05	—
Guichen	UCV	350	Warship	300, **600**	P G	N	0.05	—
Hache	UFB	80	Warship	300	P G	N	0.05	—
Haiti	—	—	Cie Gén. Transatlantique	—	—	—	—	—
Hallebarde	UDB	80	Warship	300	P G	N	0.05	—
Harpon	UDP	80	Warship	300	P G	N	0.05	—
Henri IV.	UIA	350	Warship	300, **600**	P G	N	0.05	—
Henriette	FHH	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, **600**	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Hudson [25]	FTH	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Hussard	UFQ	80	Warship	300	P G	N	0.05	—
Iberia	FRB	—	Cie Fraissinet	—	—	—	—	—
Ibis	UKA	50	Warship	300	P G	N	0.05	—
Ile de France	FVI	160	Soc. Gén. de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Iméréthie [25]	FPI	160	N. Paquet et Cie	300, **600**	P G	N	0.40	—
Infatigable	ULP	50	Warship	300	P G	N	0.05	—
Ionie	—	—	Cie de Nav. Paquet	—	—	—	—	—
Italie	FAI	270	Cie de Nav. France-Amérique	300, **600**	P G	N	0.40	—
Italia	FRI	[illegible]	Cie Fraissinet	[illegible]	[illegible]	[illegible]	[illegible]	—
Janissaire	[illegible]	[illegible]	Warship	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

		night, 325	et G. Vidor Fils, Boulogne-sur-Mer	300, 600	P G ..	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Jeannette	FHJ	Day, 160 night, 380	Soc. Nouvelle des Pêcheries à vapeur, Arcachon	300, 600	P G ..	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 10 p.m.	0.40	—
Jeanne Blanche	ULN	50	Warship	300	P G ..	N	0.05	—
Jeanne d'Arc	UCT	350	Warship	300, 600	P G ..	N	0.05	—
Jules Ferry	UCH	350	Warship	300, 600	P G ..	N	0.05	—
Jules Michelet	UCE	350	Warship	300, 600	P G ..	N	0.05	—
Jurien de la Gravière ..	UCX	350	Warship	300, 600	P G ..	N	0.05	—
Justice	UAI	350	Warship	300, 600	P G ..	N	0.05	—
Kersaint	UIW	200	Warship	300, 600	P G ..	N	0.05	—
Kléber	UCQ	350	Warship	300, 600	P G ..	N	0.05	—
La Hire	UIV	80	Warship	300	P G ..	N	0.05	—
Lansquenet	UFN	80	Warship	300	P G ..	N	0.05	—
Latouche-Treville	UIC	350	Warship	300, 600	P G ..	N	0.05	—
Lavoisier	UIN	150	Warship	300, 600	P G ..	N	0.05	—
Léon Gambetta	UCI	350	Warship	300, 600	P G ..	N	0.05	—
Liamone	FRA	—	Cie Fraissinet	—	—	—	—	—
Liger	FSL	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique ..	300, 600	P G ..	N	0.40	—
Loire (La)	FHL	260	Cie Nantaise de Nav. à Vapeur ..	300, 600	P G ..	—	0.40	—
Loiret	UJD	150	Warship	300, 600	P G ..	N	0.05	—
Lorraine [25]	FTL	160	Cie. Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Lotus	FML	270	Cie des Messageries Maritimes ..	300, 600	P G ..	—	0.40	—
Louisiane [25]	FTU	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Madonna [25]	FJM	160	Cyprien Fabre et Cie	300, 600	P G ..	N	0.40	—
Magon	UGN	80	Warship	300	P G ..	N	0.05	—
Malte [25]	FCM	160	Cie des Chargeurs Réunis.. ..	300, 600	P G ..	N	0.40	—
Mameluck	UFR	80	Warship	300	P G ..	N	0.05	—
Mangini..	UGO	80	Warship	300	P G ..	N	0.05	—
Manouba [29]	FXB	160	Cie de Nav. Mixte..	300, 600	P G ..	N	0.10	—
Marceau	ULQ	50	Warship	300, 600	P G ..	N	0.05	—
Maréchal Bugeaud [25]	FGY	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Marguerite Marie	FHM	160	Soc. Nouvelle de Pecheries à Vapeur, Archachon	300	P G ..	9 a.m. to 12 a.m., 7 p.m. to 11 p.m.	0.40	—
Marie-Rose	FHI	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, 600	P G ..	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Marsa [29]..	FXR	160	Cie de Nav. Mixte..	300, 600	P G ..	N	0.10	—
Marseillaise	UCM	350	Warship	300, 600	P G ..	N	0.05	—
Martinique [25]	FTM	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Masséna	UAO	350	Warship	300, 600	P G ..	N	0.05	—
Massue	UFC	80	Warship	300	P G ..	N	0.05	—
Medie	—	—	Cie de Nav. Paquet	—	—	—	—	—
Medjerda [29]	FXJ	160	Cie de Nav. Mixte..	300, 600	P G ..	N	0.10	—
Mexico, FTX [25]..	FTX	160	Cie Gén. Transatlantique.. ..	300, 600	P G ..	N	0.40	—
Mingrelie	—	—	Cie de Nav. Paquet	—	—	—	—	—
Mirabeau	UAC	350	Warship	300, 600	P G ..	N	0.05	—
Moise	FGS	—	Cie Gén. Transatlantique ..	—	P G ..	—	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Montcalm, UCO	UCO	350	Warship	300, **600**	P G	N	0.05	—
Montreal, FTJ [25]	FTJ	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Mortier	UEO	80	Warship	300	P G	N	0.05	—
Mousquet	UDN	80	Warship	300	P G	N	0.05	—
Mousqueton	UDZ	80	Warship	300	P G	N	0.05	—
Mustapha [28]	FXA	160	Cie de Nav. Mixte	300	P G	N	0.10	—
Navarre [25]	FTN	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Niagara, FTB [25]	FTB	160	Cie Gén Transatlantique	300, **600**	P G	N	0.40	—
Nord [20]	FZN	Day, 190; night, 380	Cie du Chemin de Fer du Nord	300, **600**	P G	N	0.15	—
Numidia	FRN	—	Cie Fraissinet	—	—	—	—	—
Obusier	UEM	80	Warship	300	P G	N	0.05	—
Oriflamme	UEV	80	Warship	300	P G	N	0.05	—
Ouessant	FGN	—	Cie Chargeurs Réunis	—	—	—	—	—
Pampa, FVP	FVP	270	Soc. Gén. de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Parana, FVN	FVN	270	Soc. Gén de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Pas-de-Calais [20]	FZP	Day, 190; night, 380	Cie du Chemin de Fer du Nord	300, **600**	P G	N	0.15	—
Patrie	UAL	350	Warship	300, **600**	P G	N	0.05	—
Paul Lecat	FNP	270	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Pérou [25]	FTP	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Pertuisane	UDI	80	Warship	300	P G	N	0.05	—
Phrygié	—	—	Cie de Nav. Paquet	—	—	—	—	—
Pierrier	UEN	80	Warship	300	P G	N	0.05	—
Pique	UDE	80	Warship	300	P G	N	0.05	—
Pistolet	UEB	80	Warship	300	P G	N	0.05	—
Plata, FVL	FVL	270	Soc. Gén. de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Pluton	UHA	150	Warship	300, **600**	P G	N	0.05	—
Poignard	UFJ	80	Warship	300	P G	N	0.05	—
Pothuau	UIB	150	Warship	300, **600**	P G	N	0.05	—
Protet	UGM	80	Warship	300	P G	N	0.05	—
Provence, FAP	FAP	160	Cie de Nav. France-Amerique	300	P G	N	0.40	—
Provence, FTD [20]	FTD	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Puerto Rico	[illegible]	[illegible]	Cie Gén. Transatlantique	[illegible]	P G	[illegible]	[illegible]	—

Requin	ULR	150	Warship	300, 600	P G	..	N	0.05	—
Résolue (Yacht)	FYR	215	M. Pierre Lebaudy	300	P G	..	N	—	—
Rhône	UJG	150	Warship	300, 600	P G	..	N	0.05	—
Rochambeau [25]	FTR	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.40	—
Roma, FJR [25]	FJR	160	Cyprien Fabre et Cie	300, 600	P G	..	N	0.40	—
Sabre	UEI	80	Warship	300	P G	..	N	0.05	—
Sabretache	UET	80	Warship	300	P G	..	N	0.05	—
Sacha	FHC	160	Soc. Nouvelle des Pêcheries à Vapeur, Archachon	300	P G	..	6 a.m. to 9 a.m., 4 p.m. to 7 p.m.	0.40	—
Sagaie	UDO	80	Warship	300	P G	..	N	0.05	—
Salta	FVS	270	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P G	..	N	0.40	—
Samson	ULH	50	Warship	300	P G	..	N	0.05	—
Sape	UEW	80	Warship	300	P G	..	N	0.05	—
Sarbacane	UDS	80	Warship	300	P G	..	N	0.05	—
Savoie [25]	FTS	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.40	—
Sentinelle	ULK	50	Warship	300	P G	..	N	0.05	—
Sidi-Brahim [25]	FVB	160	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P G	..	N	0.10	—
Spahi	UFK	80	Warship	300	P G	..	N	0.05	—
Stylet	UEK	80	Warship	300	P G	..	N	0.05	—
Sourcouf	UAN	350	Warship	300, 600	P G	..	N	0.05	—
Suffren	UIQ	150	Warship	300, 600	P G	..	N	0.05	—
Surprise, UIY	UIY	200	Warship	300, 600	P G	..	N	0.05	—
St. Anna [25]	FJS	160	Cyprien Fabre et Cie	300, 600	P G	..	N	0.40	—
St. Domingue	—	—	Cie Gén. Transatlantique.. ..	—	—		—	—	—
St. Laurent [25]	FTY	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.40	—
St. Louis, UAS	UAS	350	Warship	300, 600	P G	..	N	0.05	—
Taillebourg	ULJ	50	Warship	300	P G	..	N	0.05	—
Théodore Mante [25]	FXM	160	Cie de Nav. Mixte..	300, 600	P G	..	N	0.10	—
Timgad [29]	FGO	160	Cie Gén. Transatlantique.. ..	300	P G	..	N	0.10	—
Tirailleur	UFM	80	Warship	300	P G	..	N	0.05	—
Touraine [25]	FTT	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.40	—
Trident	UEQ	80	Warship	300	P G	..	N	0.05	—
Tromblon	UEL	80	Warship	300	P G	..	N	0.05	—
Valdivia	FVV	270	Cie Gén. de Transports Maritimes à Vapeur	300	P G	..	N	0.40	—
Vaucluse	ULO	80	Warship	300	P G	..	N	0.05	—
Venezia [25]	FJV	160	Cyprien Fabre et Cie	300, 600	P G	..	N	0.40	—
Venezuela [25]	FTW	325	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.40	—
Vergniaud	UAH	350	Warship	300, 600	P G	..	N	0.05	—
Vérité	UAJ	350	Warship	300, 600	P G	..	N	0.05	—
Versailles [25]	FGV	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.40	—
Victor Hugo	UCG	350	Warship	300, 600	P G	..	N	0.05	—
Vigilante	UKB	50	Warship	300	P G	..	N	0.05	—
Ville d'Alger [25] [29]	FGQ	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.10	—
Ville de Barcelone	VGL	—	Cie Gén. Transatlantique.. ..	—	—		—	—	—
Ville de Bône	FGB	—	Cie Gén. Transatlantique.. ..	—	—		—	—	—
Ville de Madrid	FGM	—	Cie Gén. Transatlantique.. ..	—	—		—	—	—
Ville d'Oran	FLA	—	Cie Gén. Transatlantique.. ..	—	—		—	—	—
Ville de Naples..	FGN	160	Cie Gén. Transatlantique.. ..	300, 600	P G	..	N	0.10	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Ville de Tunis [24] [30]	FGT	—	Cie Gén. Transatlantique.. ..	—	—	—	—	—
Vinh Long	UJB	150	Warship	300, **600**	P G ..	N	0.05	—
Virginie [31]	FTV	160	Cie Gén. Transatlantique.. ..	300, **600**	P G ..	N	0.40	—
Voltaire, UAD	UAD	350	Warship	300, **600**	P G ..	N	0.05	—
Voltigeur	UFL	80	Warship	300	P G ..	N	0.05	—
Waldeck-Rousseau	UCA	350	Warship	300, **600**	P G ..	N	0.05	—
Yatagan	UDH	80	Warship	300	P G ..	N	0.05	—
Zélée	UIX	200	Warship	300, **600**	P G ..	N	0.05	—
GERMANY.								
Aachen [31]	DAP	200	Norddeutscher-Lloyd	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Adamsturm	DAY	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Adelaide	DAE	325	Deutsche - Australische Dampschiffs-Ges.	300, **600**	P G ..	X	0.40	4.00
Adeline-Hugo Stinnes III ..	DAH	200	Hugo Stinnes, Müllheim	300, **600**	P G ..	X	0.40 [32]	4.00 [32]
Adler	DAD	100	D.S. Ges. Argo	300, **600**	P G ..	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40 [32]	4.00 [32]
Admiral [31]	DAL	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Adolf	DAO	60	Geestemünder Herings und Hochseefischerie-Aktienges. Geestemünde	300, **600**	P G ..	X	0.40	4.00
Adolf Woermann [31]	DAW	325	Woermann Line	300, **600**	P G ..	9.30 a.m. to 5.30 p.m. 9.30 p.m. to 1.30 a.m.	0.40	4.00
Adorna [43]	DON	200	Deutsch-Amerikanische Petroleum Ges.	300, **600**	P G ..	X	0.40	4.00
Aegir	AAE	—	Warship	300, **600**	O	N	0.40 [39]	4.00 [39]
Aenne Rickmers	DMY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00
Albany, DAK	DAK	325	Deutsche-Australische D.S. Ges.	300, **600**	P G ..	X	0.40	4.00
Albatross	AAK	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Altingia [31]	DAB	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Alda .. .. [illegible]	DAI	[illegible]	D.S. Ges. Hansa	300, 600	P G ..	X	[illegible]	4.00

GERMANY.

Aachen [31]		200	Warship	300, 600	PG ..	N	0.05	—
Adamsturm	DAP	200	Norddeutscher-Lloyd	300, 600	PG ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Adelaide	DAY	200	D.S. Ges. Hansa	300, 600	PG ..	X	0.40	4.00
Adeline-Hugo Stinnes III ..	DAR	325	Deutsche - Australische Dampfschiffs-Ges.	300, 600	PG ..	X	0.40	4.00
Adler	DAH	200	Hugo Stinnes, Mulheim	300, 600	PG ..	X	0.40	4.00
	DAD	100	D.S. Ges. Argo	300, 600	PG ..			
Admiral [31]	DAL	325	Deutsche Ost-Afrika Line ..	300, 600	PG ..	8 a.m. to 1 p.m., 3 p.m. to 6 p.m.	0.40 [33]	4.00 [33]
Adolf	DAO	60	Geestemünder Herings und Hochseefischerie-Aktienges. Geestemünde	300, 600	PG ..		0.40	4.00
Alrich	DAQ	325	D.S. Ges. Hansa	300, 600	PG ..	X	0.40	4.00
Amazone, AAM	AAM	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Ambria [31]	DMB	200	Hamburg-Amerika Line	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Amerika [31]	DDR	250	Hamburg-Amerika Line	300, 600	PG ..	N	0.40	4.00
Andree Rickmers	DND	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	PG ..	X	0.40	4.00
Annie-Hugo Stinnes VI ..	DAI	200	Hugo Stinnes	300, 600	PG ..	X	0.40 [33]	4.00 [33]
Antonina [31]	DAN	200	Hamburg-Amerika Line	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Arcadia, DXC [31]	DXC	200	Hamburg-Amerika Line	300, 600	PG ..	N	0.40	4.00
Arcona	AAR	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Argenfels	DAZ	100	D.S. Ges. Hansa	300, 600	PG ..	X	0.40	4.00
Ariadne, AAI	AAI	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Armenia [31]	DXM	200	Hamburg-Amerika Line	300, 600	PG ..	N	0.40	4.00
Arsterturm	DUA	200	D.S. Ges. Hansa	300, 600	PG ..	X	0.40	4.00
Artemisia	DTQ	—	Hamburg-Amerika Line	—	PG	—	—	—
Asgard	DAS	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, 600	PG ..	X	0.40	4.00
Asuncion [31]	DAC	200	Hamburg Süd. Am. D.S. Ges. ..	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Atto	DAT	325	Roland Line	300, 600	PG ..	X	0.40	4.00
Augsburg	AAX	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Australia, DAU	DAU	325	Deutsche-Australische D.S. Ges.	300, 600	PG ..	X	0.40	4.00
Axenfels	DAX	200	D.S. Ges Hansa	300, 600	PG ..	X	0.40	4.00
Baden	DNY	—	Hamburg Amerika Line	—	—	—	—	—
Badenia [31]	DBX	200	Hamburg Amerika Line	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Bahia	DBP	—	Hamburg-Süd Am. D.S. Ges. ..	—	PG	—	—	—
Bahia Blanca [31]	DBB	200	Hamburg-Süd. Am. D.S. Ges. ..	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Bahia Castillo [31]	DBK	200	Hamburg-Süd. Am. D.S. Ges. ..	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m	0.40	4.00
Bahia Laura [31]	DBL	200	Hamburg-Süd. Am. D.S. Ges. ..	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Barbarossa [31]	DKS	200	Norddeutscher-Lloyd	300, 600	PG ..	N	0.40	4.00
Barcelona, DBA [31] ..	DBA	200	Hamburg-Amerika Line	300, 600	PG ..	N	0.40	4.00
Bärenfels	DBH	100	D.S. Ges. Hansa	300, 600	PG ..	X	0.40	4.00
Bavaria [31]	DBV	200	Hamburg-Amerika Line	300, 600	PG ..	N	0.40	4.00
Belgia [31]	DBY	200	Hamburg Amerika Line	300, 600	PG ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Belgravia [31]	DEL	200	Hamburg-Amerika Line	300, 600	PG ..	X	0.40	4.00
Beowulf	ABW	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Berengar	DBE	325	Roland Line	300, 600	PG ..	X	0.40	4.00
Berlin, ABE	ABE	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Berlin, DKB [31]	DKB	250	Norddeutscher-Lloyd	300, 600	PG ..	N	0.40	4.00
Berthold	DBD	60	Geestemünder Herings und Hochseefischerie-Aktienges. Geestemünde	300, 600	PG ..	6 a.m. to 7 a.m., 6 p.m. to 7 p.m.	0.40	4.00
Birkenfels	BF	325	D.S. Ges. Hansa	300, 600	PG ..	X	0.40	4.00
Bitiz	BZ	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Blücher, ABL	ABL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Blücher, DDB [31]	DDB	250	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Bochum	DOM	325	Deutsche-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Bohemia, DBJ [31]	DBJ	200	Hamburg-Amerika Line	300, **600**	P G	X	0.40	4.00
Bosnia [31]	DBZ	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Brasilia	DQI	—	Hamburg-Amerika Line	—	P G	—	—	—
Brandenburg, ABD	ABD	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Brandenburg, DBG [31]	DBG	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Braunfels	DBC	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Braunschweig	ABG	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Bremen, ABN	ABN	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Bremen, DBR [31]	DBR	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Breslau, ABX	ABX	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Breslau, DBU [31]	DBU	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Brisbane, DBI	DBI	325	Deutsche-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Brisgavia [31]	DBQ	200	Hamburg-Amerika Line	300, **600**	P G	X	0.40	4.00
Bubendy	DEY	—	Hamburg-Amerika Line	—	—	—	—	—
Buenos Aires, DBS [31]	DBS	200	Hamburg-S. Am. D.S. Ges	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Buffalo	DFF	—	Deutsche-Amerikanische Petroleum Ges	—	P G	—	—	—
Bulgaria	DDG	—	Hamburg-Amerika Line	—	—	—	—	—
Bülow [31]	DBW	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Bürgermeister [31]	DBM	325	Deutsche Ost.-Afrika Line	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Camarones	DOA	—	Hamburg S. Am. D.S. Ges.	—	—	—	—	—
Cannstatt	DTT	325	Deutsche-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Cap Arcona [31]	DCA	325	Hamburg-S. Am. D.S. Ges.	300, **600**	P G	N	0.40	4.00
Cap Blanco [31]	DCB	325	Hamburg-S. Am. D.S. Ges.	300, **600**	P G	N	0.40	4.00
Cap Finisterre [31]	DCN	325	Hamburg-S. Am. D.S. Ges.	300, **600**	P G	N	0.40	4.00
Cap Ortegal [31]	DCO	250	Hamburg-S. Am. D.S. Ges.	300, **600**	P G	N	0.40	4.00
Cap Roca [31]	DCR	200	Hamburg-S. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Cap Trafalgar	DCP	—	Hamburg-S. Am. D.S. Ges.	—	P G	—	—	—
Cap Verde [31]	DCE	200	Hamburg-S. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m.,	0.40	4.00
Cap Vilano [31]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible], DDC[33]	DDC	250	[illegible]	300, 600	PG	N	[illegible]	[illegible]
Claire-Hugo Stinnes I.	DCS	200	Hugo Stinnes	300, 600	PG	X	0.40	4.00
Clara Blumenfeld	DCL	200	Freight Agent Bd., Blumenfeld	300, 600	PG	X	0.40[33]	4.00[33]
Cleveland, DDV[31]	DDV	250	Hamburg-Amerika Line	300, 600	PG	N	0.40	4.00
Cobra[31]	DCD	60	Hamburg-Amerika Line	300, 600	PG	N	0.12	—
Coburg[31]	DCG	200	Norddeutscher-Lloyd	300, 600	PG	N	0.40	4.00
Colmar	DOL	325	Deutsche-Australische D.S. Ges.	300, 600	PG	X	0.40	4.00
Cöln	ACO	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Condor	ACN	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Corcovado[31]	DRC	250	Hamburg-Amerika Line	300, 600	PG	N	0.40	4.00
Cordoba, DCK[31]	DCK	200	Hamburg-Sud. Am. D.S. Ges.	300, 600	PG	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Cormcran	ACM	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Crefeld[31]	DCT	200	Norddeutscher-Lloyd	300, 600	PG	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Crostafels	DOT	200	D.S. Ges. Hansa	300, 600	PG	X	0.40	4.00
Dania[31]	DDX	200	Hamburg-Amerika Line	300, 600	PG	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Danzig	ADZ	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Deike Rickmers	DIK	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	PG	X	0.40	4.00
Delphin	ADC	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Derfflinger[31]	DER	325	Norddeutscher-Lloyd	300, 600	PG	N	0.40	4.00
Deutschland, ADE	ADE	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Deutschland, DDE	DDE	325	German Antarctic Expedition	300, 600	PG	—	0.40	4.00
Deutschland, DDU[36]	DDU	110	Prussian Railway	300, 600	O[34] PR[35]	X	0.18[37]	1.80[37]
Deutschland, DEU[43]	DEU	200	Deutsche-Amerikanische Petroleum Ges.	300, 600	PG	X	0.40	4.00
Diedrich	DTD	60	Geestemünder Herings- und Hochseefischerei-Aktienges.	300, 600	PG	6 a.m. to 7 a.m., 6 p.m. to 7 p.m.	0.40	4.00
Dora-Hugo Stinnes XII.	DOS	200	Hugo Steinnes	300, 600	PG	X	0.40	4.00
Dorothea Rickmers	DDY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	PG	X	0.40	4.00
Drache	ADA	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Drachenfels	DCH	100	D.S. Ges. Hansa	300, 600	PG	X	0.40	4.00
Dresden, ADR	ADR	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Düsseldorf	DSU	325	Deutsche-Australische D.S. Ges.	300, 600	PG	X	0.40	4.00
Eber	AEB	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Ebernburg	DEG	—	D.S. Ges. Hansa	—	PG	—	—	—
Edmund-Hugo Stinnes IV.	DEH	200	Hugo Steinnes	300, 600	PG	X	0.40[33]	4.00[33]
Edward	DED	60	Geestemünder Herings- und Hochseefischerei-Aktienges.	300, 600	PG	X	0.40	4.00
Ehrenfels	DEV	200	D.S. Ges. Hansa	300, 600	PG	X	0.40	4.00
Eisenach[31]	DEI	200	Norddeutscher-Lloyd	300, 600	PG	N	0.40	4.00
Eleonore Woermann[31]	DEW	325	Woermann Line	300, 600	PG	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Elisabeth Rickmers	DRX	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	PG	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Elkab	DEB	325	D.S. Ges. Kosmos	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Ellen Rickmers	DEX	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00
Elsass, AEL	AEL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Elsass, DEC	DEC	200	Norddeutscher-Lloyd	300, **600**	P G ..	X	0.40	4.00
Emden	AEM	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Entrerios, DIO [31]	DIO	200	Hamburg Süd. Am. D.S. Ges. ..	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Erlangen [31]	DEN	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Ernst-Hugo Stinnes XI. ..	DES	200	Hugo Stinnes	300, **600**	P G ..	X	0.40	4.00
Essen	DEA	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Esslingen	DEE	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Etha Rickmers	DYR	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00
Excelsior, DEO [46]	DEO	200	Deutsche - Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00
Fangturm	DFA	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Feldmarschall [31]	DFL	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Ferencz Joszef Kiraly ..	—	—	"Adria" KGL Ungarische See-schifffahrts A.G.	—	—	—	—	—
Frankenwald [31]	DFD	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Frankfurt [31]	DFT	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Frauenlob	AFO	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Freienfels	DFS	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Fremantle	DFE	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Freya	AFR	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Friedrich Carl	AFS	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Friedrich der Grosse, AFU ..	AFU	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Friedrich der Grosse, DKD [31]	DKD	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Friesenberg	DBO	200	Hermann Kimme	300, **600**	P G ..	X	0.40	4.00
Frithjof, AVT	AVT	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]

[illegible]	AG[illegible]	—	Warship	300, [illegible]	O ..	N	0.40 [33]	4.00 [33]
Geier	AGI	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
General [31]	DGL	325	Deutsche Ost-Afrika Line	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
George Washington [31]	DKN	250	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Gertrud Woermann [8]	DGW	325	Woermann Line	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Giessen [31]	DGI	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Gneisenau, AGN	AGN	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Gneisenau, DGU [31]	DGU	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Goeben, AGO	AGO	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Goeben, DGN [31]	DGN	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Goetz	DLM	200	Deutsche Reederei G. m. b. H.	300, 600	P G	X	0.40	4.00
Goldenfels	DGF	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Gotha [31]	DGT	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Gouverneur Jaeschke	DGJ	—	Hamburg-Amerika Line	—	P G	—	—	—
Graf Waldersee [31]	DDW	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Granada	DQN	—	Hamburg-Amerika Line	—	P G	—	—	—
Grete-Hugo Stinnes VIII.	DGH	200	Hugo Stinnes	300, 600	P G	X	0.40 [33]	4.00 [33]
Grille	AGS	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Grosser Kurfürst [31]	DKG	250	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Grossherzog von Oldenburg	DGO	200	Norddeutsche Seekabelwerke Coy.	300, 600	— [33]	X	—	—
Grunewald [31]	DGR	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Gutenfels	DGB	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Habsburg, DHG [31]	DHG	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Hagen, AHA	AHA	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Hagen, DHJ [63]	DHJ	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Haimon	DHA	325	Roland Line	300, 600	P G	X	0.40	4.00
Hamburg, AHM	AHM	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Hamburg, DDH [31]	DDH	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Hannover, AHV	AHV	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Hannover, DHV [31]	DHV	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Hansa	AHN	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Harport [63]	DHP	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Harzburg	DZG	—	D.S. Ges. Hansa	—	P G	—	—	—
Hathor [63]	DHC	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Hay	AHP	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Heimdall	AHD	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Heinrich-Hugo Stinnes VII.	DHH	200	Hugo Stinnes	300, 600	P G	X	0.40 [33]	4.00 [33]
Heinz	DTM	200	Deutsche-Reederie G. m. b. H.	300, 600	P G	X	0.40	4.00
Hela	AHL	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Helene Blumenfeld	DHB	200	Freight Agent Bd. Blumenfeld	300, 600	P G	X	0.40 [33]	4.00 [33]
Helene-Hugo Stinnes XIV.	DHU	200	Hugo Stinnes	300, 600	P G	X	0.40	4.00
Helgoland, AHC	AHC	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Helios, DHS [43]	DHS	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Heluan [31]	DHE	325	D.S. Ges. Kosmos	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Henny Woermann [31]	DHW	325	Woermann Line	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Hera [43]	DHK	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Hertha	AHT	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Herzogin Cecilie	DHZ	200	Norddeutscher-Lloyd	300, **600**	P G	X	0.40	4.00
Hesperus [43]	DHX	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Hessen	AHE	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Hildebrand, AHI	AHI	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Hilde-Hugo Stinnes X.	DHI	200	Hugo Stinnes	300, **600**	P G	X	0.40 [33]	4.00 [33]
Hobart	DHT	325	Deutsche-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Hohenfels	DHM	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Hohenstaufen [31]	DHN	250	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Hohenzollern	AHO	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Holger	DHR	325	Roland Line	300, **600**	P G	X	0.40	4.00
Holstein	DHL	325	Roland Line	300, **600**	P G	X	0.40	4.00
Huberfels	DHD	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Iltis	AIL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
[illegible]kenturm	DIM	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Imperator, DIR [31]	DIR	100	Stettiner D.S. Ges. I. F. Braeunlich G. m. b. H.	300, **600**	P G	— [43]	0.18	1.80
Imperator, DIT [31]	DIT	325	Hamburg-Amerika Line	300, **600**, 1,800	P G	N	0.40	4.00
Irene	AIR	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Irmingard	DID	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, **600**	P G	X	0.40	4.00
Jade	AIA	80	Imperial Ministry of Marine	300, **600**	O	X	0.40 [33]	4.00 [33]
Jaguar	AIG	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Java	DJV	325	Deutsche-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Kaiser, AKS	AKS	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Kaiser, DKO [31]	DKO	[illegible]	Hamburg-Amerika Line	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Kaiser [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

			Warship		O	N	0.40[33]	4.00[33]
Kaiser Wilhelm der Grosse, DKW	DKW	250	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Kaiserin	AKT	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiserin Augusta	AKA	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiserin Auguste Victoria[31]	DDA	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Kamerun	DUN	—	Hamburg-Amerika Line	—	—	—	—	—
Kandelfels	DKU	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Karlsruhe	AKU	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Karnak[43]	DNK	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Kiowa	DKX	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Kleist[31]	DST	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Kolberg	AKN	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Köln[31]	DKC	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Komet	DKT	80	Protectorate of New Guinea	300, 600	O	X	0.40[33]	4.00[33]
Kommodore[43]	DOR	325	Deutsche Ost-Afrika Line	300, 600	P G	—	0.40	4.00
Konig	DKJ	325	Deutsche Ost-Afrika Line	300, 600	P G	X	0.40	4.00
König Albert, AAL	AAL	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
König Albert, DKO[31]	DKO	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
König Friedrich August[31]	DFR	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
König Wilhelm II.[31]	DDK	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Königin Luise, DKL[31]	DKL	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Königin Luise, DLL[31]	DLL	200	Hamburg-Amerika Line	300, 600	P G	N	0.12	—
Königsberg	AKO	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kraft	AKV	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kronprinz[31]	DPZ	325	Deutsche Ost-Afrika Line	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Kronprinz Wilhelm[31]	DKP	250	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Kronprinzessin Cecilie, DCI[31]	DCI	325	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Kronprinzessin Cecilie, DKA[31]	DKA	250	Norddeutscher-Lloyd	300, 600	P G	N	0. 40	4.00
Kybfels	DKY	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Lauterfels	DLA	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Leipzig	ALE	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Lensahn[43]	DLE	175	Grand Duke of Oldenburg	300, 600	P	—	0.40	4.00
Lichtenfels	DLS	100	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Liebenfels	DLB	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Lilly Rickmers	DLY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	X	0.40	4.00
Lindenfels	DLI	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Loki[43]	DLK	200	Deutsch-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Loongmoon	DLN	—	Hamburg-Amerika Line	—	P G	—	—	—
Lothringen	ALO	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Löwenburg	DLQ	—	D.S. Ges. Hansa	—	P G	—	—	—
Lubeck	ALK	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Luchs	ALU	—	Warship	300, 600	O	N	0.40[33]	4.00[33]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Lucie Woermann [31]	DLW	325	Woermann Line	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Lüneburg	DLU	325	Deutsch-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Lützow [31]	DLO	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Madeleine Rickmers	DMC	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G	X	0.40	4.00
Magdeburg	AMB	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Main [31] ...	DKI	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Mainz ...	AMC	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Mai Rickmers	DMT	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G	X	0.40	4.00
Mannheim	DMM	325	Deutsche-Australische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Marienfels	DMS	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Mark [31]	DMD	325	Norddeutscher-Lloyd	300, **600**	P G	X	0.40	4.00
Mecklenburg	DMQ	—	Hamburg-Amerika Line	—	—	—	—	—
Mecklenburg, AME	AME	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Medusa, AMD	AMD	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Melbourne, DME	DME	325	Deutsch-Australische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Memphis [40]	DMP	325	D.S. Ges. Kosmos	300, **600**	P G	X	0.40	4.00
Menes [43]	DMN	200	D.S. Ges. Kosmos	300, **600**	P G	X	0.40	4.00
Mera [43]	DMX	200	D.S. Ges. Kosmos	300, **600**	P G	X	0.40	4.00
Meteor [31]	DMR	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Mohawk, DMK [40]	DMK	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Mohican [40]	DMI	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Moltke, AMT	AMT	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Moltke, DDM [31]	DDM	250	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Moltkefels	DMO	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Möwe, AMW	AMW	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Möwe, DMW	DMW	100	D.S. Ges. Argo	300, **600**	P G	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to [illegible] p.m.	0.40	4.00

Navarra [21]	DNV	325	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Neckar [21]	DKK	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Negada [21]	DNA	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Neidenfels	DNS	100	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Neuenfels	DNU	100	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Niobe, ANI	ANI	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Nitokris [21]	DNI	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Nixe [21]	DNX	60	Norddeutscher-Lloyd	300, 600	P G	10 a.m. to 12 a.m., 1 p.m. to 3 p.m.	0.12	—
Nora-Hugo Stinnes II.	DNH	200	Hugo Stinnes	300, 600	P G	X	0.40	4.00
Norder	ANR	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Normannia, DNO [43]	DNO	200	Reederei W. Kunstmann	300, 600	P G	10 a.m. to 11 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m.	0.40	4.00
Nürnberg	ANU	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Nymphe, ANY	ANY	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Ockenfels	DOC	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Odin, AOD	AOD	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
O. I. D. Ahlers	DAR	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Oldenburg	AOL	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Osage [43]	DOG	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Ostfriesland	AOF	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Otter	AOT	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Otto-Hugo Stinnes IX.	DOH	200	Hugo Stinnes	300, 600	P G	X	0.40 [33]	4.00 [33]
Pagenturm	DTV	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Palatia	DPJ	—	Hamburg-Amerika Line	—	P G	—	—	—
Pallanza [21]	DDQ	200	Hamburg Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Panther, APA	APA	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Patricia [21]	DDP	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Pawnee [43]	DPF	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Peter Rickmers	DPM	200	Rickmers Reismühlen, Reederei und Schiffbau, A. G.	300, 600	P G	X	0.40	4.00
Pelikan, APE	APE	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Pennsylvania [21]	DDN	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Persepolis	DEP	—	Hamburg-Amerika Line	—	P G	—	—	—
Pfalz	DPA	—	Norddeutscher-Lloyd	—	—	—	—	—
Pfeil	APF	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Phœbus [43]	DPU	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Pisa, DDF [21]	DDF	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Planet	APL	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Plata, DLP (La) [21]	DLP	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00

Ship Stations—*Continued*

Name	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GERMANY—*cont.*							Francs.	Francs.
Polynesia [31]	DPO	325	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Pommern, APM	APM	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Pommern, DPX [31]	DPX	200	Norddeutscher-Lloyd	300, **600**	P G	X	0.40	4.00
Poseidon [3]	DPY	325	Government	300, **600**	P G	X	0.40	4.00
Posen, APO	APO	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Posen, DPQ [31]	DPQ	200	Norddeutscher-Lloyd	300, **600**	P G	X	0.40	4.00
Präsident [31]	DPT	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
President Grant [31]	DDS	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
President Lincoln [31]	DDI	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Pretoria [31]	DDT	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Preussen, APR	APR	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Preussen, DPC [34]	DPC	110	Prussian Railway Administration	300, **600**	O [34] P R [35]	X	0.18 [37]	1.80 [37]
Princess Alice, DKZ [31]	DKZ	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Prinz Adalbert, AAD	AAD	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Prinz Adalbert, DDZ [31]	DDZ	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Prinz August Wilhelm [31]	DSB	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinz Eitel Friedrich, DPE [31]	DPE	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Prinz Eitel Friedrich, DPI	DPI	200	Neue Dampfer Kompagnie	300, **600**	P G	— [48]	0.25	2.50
Prinz Eitel Friedrich, DSI [31]	DSI	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinz Friedrich Wilhelm [31]	DKF	250	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Prinz Heinrich, AHR	AHR	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Prinz Heinrich, DPB [31]	DPB	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Prinz Joachim [31]	DSP	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinz Ludwig [31]	DPL	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Prinz Oskar [31]	DDO	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Prinz Sigismund [31]	DSG	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinzess Irene [31]	DKR	200	Norddeutscher-Llod	300, **600**	P G	N	0.40	4.00
Prinzess Wilhelm	AWL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Prinzessin [31]	DPN	325	Deutsche Ost-Afrika Line	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to	0.40	4.00

						p.m., 9.30 p.m. to 1.30 a.m.		
Prinzregent Luitpold, ALP	ALP	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Prinz-Regent Luitpold, DRL [31]	DRL	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Professor Woermann [31]	DPW	325	Woermann Line	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Prometheus, DOP [43]	DOP	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	X	0.40	4.00
Rabenfels	DRF	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Ramses [43]	DRM	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Rappenfels	DRK	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rauenfels	DUE	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Regina	DRI	200	Rud. Chris. Gribel	300, 600	P G	— [47]	0.25	2.50
Reichenfels	DXR	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rhætia [31]	DRE	325	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rhakotis [31]	DRH	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Rhein [31]	DKR	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Rheinland, ARL	ARL	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Rheinland, DRJ	DRJ	200	Norddeutscher-Lloyd	300, 600	P G	X	0.40	4.00
Rhenania, DIA [31]	DIA	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rhenania, DRZ [43]	DRZ	200	Reederei W. Kuntsmann	300, 600	P G	10 a.m. to 11 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m.	0.40	4.00
Rhodopis [31]	DRS	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Rio Grande, DRR [31]	DRR	325	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rio Negro [31]	DRQ	325	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rio Pardo [31]	DRP	325	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Roda [31]	DRA	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Roland, DRB	DRB	75	Vereinigte Bugsir- und Frachtschiffahrts-Ges.	300, 600	P G	X	0.40	4.00
Roland, DRV	DRV	325	Roland Line	300, 600	P G	X	0.40	4.00
Rolandseck	DRW	100	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Roon, ARO	ARO	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Roon, DRN [31]	DRN	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Rostock	ARK	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Rotenfels	DRT	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rugia, [31]	DRU	325	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rüstringen	ARU	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Sabine Rickmers	DIB	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G	X	0.40	4.00
Sakkarah [43]	DYD	325	D.S. Ges. Kosmos	300, **600**	P G	X	0.40	4.00
Salamanca [31]	DSH	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Salatis	DYC	—	D.S. Ges. Kosmos	—	P G	—	—	
San Nicolas	DJC	—	Hamburg-Süd. Am. D.S. Ges.	—	P G	—	—	
Santa Cruz [31]	DNZ	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Elena	DNL	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Fé [31]	DNN	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Maria [31]	DNM	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Rita [31]	DNR	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santos [31]	DTO	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sardinia, DSJ [31]	DSJ	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sarnia, DSM [31]	DSM	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Scharnhorst, ASB	ASB	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Scharnhorst, DSA [31]	DSA	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Scharzfels	DXA	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schaumburg	DXD	—	Hamburg-Amerika Line	—	P G	—	—	—
Schildturm	DTX	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schlesien	ASN	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Schleswig [31]	DSW	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Schleswig-Holstein	ASX	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Schönfels	DXB	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schwaben	ASA	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Schwalbe	DSL	100	D.S. Ges. Argo	300, **600**	P G	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40 [33]	4.00 [33]
[illegible]	[illegible]	[illegible]	D.S. Ges. Argo	300, **600**	P G	8 a.m. to 1 p.m., [illegible]	[illegible]	4.00 [33]

Sebara [40]	DYE	325	D.S. Ges. Kosmos	300, 600	P G	12 p.m. to 2 a.m.	0.40	4.00
Seeadler, ASE	ASE	—	Warship	300, 600	O ..	X	0.40 [33]	4.00 [33]
Seeadler, DSE	DSE	60	Norddeutscher-Lloyd	300, 600	— [33]	N	0.40	4.00
Senator Schäfer	DSS	100	Cuxhavener Hochseefischerei-Aktienges.	300, 600	P G	10 a.m. to 12 a.m., 4 p.m. to 6 p.m. X	0.40	4.00
Senator von Berenberg Gossler	DSD	100	Cuxhavener Hochseefischerei-Aktienges.	300, 600	P G	X	0.40	4.00
Serapis	DIP	200	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Setos [40]	DYF	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Seydlitz, AST	AST	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Seydlitz, DSZ [31]	DSZ	325	Norddeutscher Lloyd	300, 600	P G	N	0.40	4.00
Sibiria [31]	DSV	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Siegfried	ASI	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Sierra Cordoba [31]	DOD	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Sierra Nevada [31]	DNE	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Sierra Salvada [31]	DVA	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Sierra Ventana [31]	DVE	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Sikiang	DGS	—	Hamburg-Amerika Line	—	P G	—	—	—
Silvana [31]	DAV	60	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.12	—
Silvia [31]	DSQ	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sioux [40]	DXS	200	Deutsche-Amerikanische Petroleum Ges.	300, 600	P G	X	0.40	4.00
Sirius	DJN	—	Deutsche - Amerikanische Petroleum Ges.	—	P G	—	—	
Sisak	DYH	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Sithonia [31]	DTH	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Sleipner	ASL	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Solfels [31]	DOU	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Sonnenberg	DDD	200	Hermann Kimme	300, 600	P G	X	0.40	4.00
Sophie Rickmers	DRY	200	Rickmers Reismühlen, Reederie und Schiffbau, A.G.	300, 600	P G	X	0.40	4.00
Sperber	DSK	100	D.S. Ges. Argo	300, 600	P G	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40 [33]	4.00 [33]
Spitzfels	DOZ	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Spreewald [31]	DSO	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Staatssekretar Kraetke	DTK	—	Hamburg-Amerika Line	—	—	—	—	—
Steigerwald [31]	DGD	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Steinturm	DUM	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Stephan	DSC	325	Norddeutsche Seekabelwerke Coy.	300, 600	— [33]	X	—	—
Stettin	ASY	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Stolberg	DLG	325	Deutsche-Australische D.S. Ges.	300, 600	P G	X	0.40	4.00
Stralsund	ASM	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]
Strassburg	ASK	—	Warship	300, 600	O ..	N	0.40 [33]	4.00 [33]

Ship Stations—*Continued*

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GERMANY—*contd.*							Francs.	Francs.
Sturmfels	DUR	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Stuttgart	ASZ	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Sudmark	DMV	—	Hamburg Amerika Line	—	—	—	—	—
Sumatra, DUD	DUD	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Sydney, DSY	DSY	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Syria, DSR [31]	DSR	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Tabora [31]	DTA	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Taku	ATK	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Tannenfels	DTS	100	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Tasmania	DTB	325	Deutsche-Australische D.S. Ges.	300, **600**	P G ..	X	0.40	4.00
Tecumseh [32]	DTC	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00
Thessalia [31]	DTE	325	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Thetis, ATH	ATH	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Thüringen	ATU	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Thuringia [31]	DTU	325	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Tiger, ATI	ATI	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Titania	ATG	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Trautenfels	DTR	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Trifels	DTI	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Triton, DTN [32]	DTN	200	Deutsche-Amerikanische Petroleum-Ges.	100, **600**	P G ..	X	0.40	4.00
Tsingtau	ATV	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Tucuman	DMA	—	Hamburg S. Am. D.S. Ges. ..	—	—	—	—	—
Uarda [32]	DUU	200	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00
Undine	AUN	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Ursula Rickmers	DUL	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00
Utgard	DUT	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, **600**	P G ..	X	0.40	4.00
Valencia [31]	DVC	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00

Vineta	AVN	—	Warship	[illegible]	O	N	[illegible]	[illegible]
Virginia, DVI	DVI	200	Hamburg-Amerika Line	300, 600	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40 [33]	4.00 [33]
von der Tann	ATN	—	Warship	300, 600	O	N	0.40	4.00
Vulkan	AVU	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Wachtfels	DOW	200	D.S. Ges. Hansa	300, 600	P G ..	X	0.40 [33]	4.00 [33]
Wangard	DWA	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, 600	P G ..	X	0.40	4.00
Wartburg	DWC	200	D.S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Wartenfels	DWV	200	D.S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Warturm	DWT	200	D. S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Wasgenwald [31]	DWG	200	Hamburg-Amerika Line	300, 600	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Washington, DWB [43]	DWB	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G ..	X	0.40	4.00
Westerwald [31]	DWE	200	Hamburg-Amerika Line	300, 600	P G[30] ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [30]	2.50 [30]
Westfalen	AWA	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Wettin	AWE	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Wiegand	DWI	325	Roland Line	300, 600	P G ..	X	0.40 [8]	4.00
Wildenfels	DWL	100	D.S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Wilhelms	DWS	100	Government	300, 600	particular correspondence	X	0.40	4.00
Willehad [31]	DWH	200	Norddeutscher-Lloyd	300, 600	P G ..	N	0.40	4.00
Willkommen [31]	DWN	60	Hamburg-Amerika Line	300, 600	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.12	—
Windhuk [31]	DWK	325	Hamburg-Amerika Line	300, 600	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Wismar	DWR	325	Deutsche-Australische D.S. Ges...	300, 450, 600	P G ..	X	0.40	4.00
Wittekind [31]	DWD	200	Norddeutscher-Lloyd	300, 600	P G ..	N	0.40	4.00
Wittelsbach	AWI	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Wörth	AWO	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Wotan [43]	DWO	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G ..	X	0.40	4.00
Württemberg	AWU	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Wurzenburg [31]	DWU	200	Norddeutscher-Lloyd	300, 600	P G ..	N	0.40	4.00
Yorck, AYO	AYO	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Yorck, DYK [31]	DYK	325	Norddeutscher-Lloyd	300, 600	P G ..	N	0.40	4.00
Ypiranga [31]	DYA	250	Hamburg-Amerika Line	300, 600	P G ..	N	0.40	4.00
Zähringen	AZA	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Zieten, AZI	AZI	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Zieten, DZN	DZN	325	Norddeutscher-Lloyd	300, 600	P G ..	N	0.40	4.00
GREAT BRITAIN								
Aaro [44]	MWA	250	T. Wilson Sons & Co.	300, 600	P G ..	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [44]	0.90 [44]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Abangarez	GHL	260	Tropical Fruit S.S. Co.	300, **600**	P G	N	0.40	—
Abosso [44]	GDI	250	Elder Dempster	300, **600**	P G	N	0.40	—
Aboukir	BCX	—	Navy	—	O	—	—	—
Acasta	BHS	—	Navy	—	O	—	—	—
Achates	BHT	—	Navy	—	O	—	—	—
Acheron	BHU	—	Navy	—	O	—	—	—
Achilles	BCY	—	Navy	—	O	—	—	—
Acorn	BHV	—	Navy	—	O	—	—	—
Actaeon	BOP	—	Navy	—	O	—	—	—
Active	BHD	—	Navy	—	O	—	—	—
Adamant	BPN	—	Navy	—	O	—	—	—
Adriatic [44]	MHC	250	White Star Line	300, **600**	P G	N	0.40	—
Adventure	BHK	—	Navy	—	O	—	—	—
Aeneas [44]	MFU	250	A. Holt & Co.	300, **600**	P G	X	0.40	—
Aeolus	BEV	—	Navy	—	O	—	—	—
Afric [44]	MYC	250	White Star Line	300, **600**	P G	X	0.40	—
Africa, BAA	BAA	—	Navy	—	O	—	—	—
Afridi	BHW	—	Navy	—	O	—	—	—
Agadir [44]	GFE	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Agamemnon	BAB	—	Navy	—	O	—	—	—
Aguila [44]	GFF	250	Yeoward Bros.	300, **600**	P G	X	0.40	—
Aidan [44]	MFM	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Ajana	GTI	250	Australian S.S. Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Ajax, BAC	BAC	—	Navy	—	O	—	—	—
Ajax, GUZ	GUZ	175	A. Holt & Co.	300, **600**	P G	X	0.40	4.00
Akabo [44]	MZE	250	Elder Dempster	300, **600**	P G	N	0.40	—
Alacrity	BQI	—	Navy	—	O	—	—	—
Alarm	BHX	—	Navy	—	O	—	—	—
Alaunia [44]	GAI	250	Cunard Line	300, **600**	P G	N	0.40	—
Albemarle	BAD	—	Navy	—	O	—	—	—
Alberta (S.Y.)	MHW	200	J. B. Cohn	300, **600**	P	X	0.40	—
Albion	BAE	—	Navy	—	O	—	—	—
Alcala [44]	MJW	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Alcantara [44]	MRR	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Alecto	BPO	—	Navy	—	O	—	—	—
Alert	[illegible]	—	Navy	—	O	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	—	—

Amber	GFI	140	Eastern Telegraph Co.	300, 600	P	—	0.40	—
Ambrose [44]	MDR	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Ambuscade	BHZ	—	Navy	—	O	—	—	—
Amethyst	BGN	—	Navy	—	O	—	—	—
Amphion	BHE	—	Navy	—	O	—	—	—
Amphitrite	BEF	—	Navy	—	O	—	—	—
Amsterdam	GPF	130	Great Eastern Railway	300, 450, 600 [44]	P R [47]	N	0.10	1.00
Anchises [44]	MFW	250	A. Holt & Co.	300, 600	P G	X	0.40	—
Andania [44]	GAH	250	Cunard Line	300, 600	P G	N	0.40	—
Andes, MRQ [44]	MRQ	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Andorinha [44]	MIU	250	Yeoward Bros.	300, 600	P G	X	0.40	—
Andromache	BQQ	—	Navy	—	O	—	—	—
Andromeda	BEG	—	Navy	—	O	—	—	—
Anglia	GRE	170	London & North Western Railway	300, 600	P G	N	0.05	0.50
Anglian [44]	MNR	250	Wilsons & Furness-Leyland Line	300, 600	P G	N	0.40	—
Angora [44]	GFL	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Anselm [44]	MDK	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Antelope	BPP	—	Navy	—	O	—	—	—
Antillian [44]	MJL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Antilochus	GTC	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Antony [44]	MAY	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Antrim, BCZ	BCZ	—	Navy	—	O	—	—	—
Antrim, GPN	GPN	150	Midland Railway	300, 400, 600 [44]	P R [48]	N	0.05	0.50
Aparima [44]	GIM	250	Union S.S. Co. of New Zealand	300, 600	P G	N	0.40	—
Apollo	BQR	—	Navy	—	O	—	—	—
Appalachee [44]	GFM	150	Anglo-American Oil Co.	300, 600	P G	N	0.40	—
Appam [44]	GDJ	250	Elder Dempster	300, 600	P G	N	0.40	—
Aquarius	BQS	—	Navy	—	O	—	—	—
Arab	BIA	—	Navy	—	O	—	—	—
Arabia [44]	MMZ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Arabic [44]	MFC	250	White Star Line	300, 600	P G	N	0.40	—
Arabistan	GOJ	90	Strick Line	300, 600	P G	X	0.40	—
Aracataca	MLB	150	Elders & Fyffes	300, 600	P G	X	0.40	—
Aragon [44]	MBN	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Araguaya [44]	MBG	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Arankola [44]	GFN	250	British India Steam Nav. Co.	300, 600	P G	N	0.40	—
Aranmore	MKU	200	J. Holliday	300, 600	P G	X	0.40	—
Arawa [44]	MWE	250	Shaw, Savile & Albion	300, 600	P G	X	0.40	—
Arcadia, GFO [44]	GFO	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Arcadian [44]	MJR	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40 [48]	— [48]
Archer	BIB	—	Navy	—	O	—	—	—
Ardent	BIC	—	Navy	—	O	—	—	—
Ardeola [44]	GCI	250	Yeoward Bros.	300, 600	P G	X	0.40	—
Argentino (El) [44]	GGT	250	Argentine Cargo Line	300, 600	P G	X	0.40	—
Argonaut	BEH	—	Navy	—	O	—	—	—
Argyll	BDA	—	Navy	—	O	—	—	—
Ariadne, BEI	BEI	—	Navy	—	O	—	—	—
Ariel	BID	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Argyllshire	GTJ	220	Turnbull, Martin & Co.	300, 450, **600**	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Arlanza “	GFP	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Armadale	GQT	250	Australind S.S. Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Armadale Castle “	MQG	250	Union Castle	300, **600**	P G	N	0.40	—
Armenian “	MYR	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Aronda “	MAZ	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Arrino	GQU	250	Australind S.S. Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Arrogant	BEW	—	Navy	—	O	—	—	—
Arun	BIE	—	Navy	—	O	—	—	—
Arundel	MDZ	90	L.B. & S.C. Railway Co.	300, **600**	P G	N	—	—
Arzila “	GFQ	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Ascania “	MTU	250	Cunard Line	300, **600**	P G	N	0.40	—
Ascanius “	MFV	250	A. Holt & Co.	300, **600**	P G	X	0.40	—
Ascot	MKZ	150	Britain S.S. Co.	300, **600**	P G	X	0.40	—
Ashburton	GQV	250	Australind S.S. Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Ashtabula, GKC “	GKC	100	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—
Asian “	MKL	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Aspinet	GTY	125	Tank Storage & Carriage Co.	300, **600**	P	X	—	—
Assaye “	MOO	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Assistance	BOM	—	Navy	—	O	—	—	—
Astraea	BEX	—	Navy	—	O	—	—	—
Asturias “	MBB	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Atahualpa “	MDU	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Atenas	GHP	250	Tropical Fruit S.S. Co.	300, 400, **600**	P G	7 a.m. to 9 p.m.	0.40	—
Athenia “	MBA	250	Donaldson Bros.	300, **600**	P G	N	0.40	—
Athenic “	MWN	250	White Star Line	300, **600**	P G	X	0.40	—
Atlantian “	MVL	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Attack	BIF	—	Navy	—	O	—	—	—
[illegible]	BHL	—	Navy	—	O	—	—	—
[illegible]	BAF	—	Navy	—	O	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—

						9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Bacchante, BDB								
Badger ..	BDB	—	Navy	—	O ..	—	—	—
Balantia "	BIH	—	Navy	—	O ..	—	—	—
Ballarat "	GIH	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
	MKQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Balmoral Castle "	MPW	250	Union Castle	300, 600	P G	N	0.40	—
Baltic "	MBC	250	White Star Line	300, 600	P G	N	0.40	—
Banca "	MFS	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Bandra ..	MCH	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Banffshire	MOQ	150	Scottish Shire Line	300, 600	P G	X	0.40	—
Bankura "	GCH	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Bantu "	GAY	250	Isthmian S.S. Co.	300, 600	P G	X	0.40	—
Barala "	GCM	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Bardolph	MGE	100	Hellyers Steam Fishing Co.	300, 600	P ..	X	0.05	—
Barham ..	BGO	—	Navy	—	O ..	—	—	—
Barjora	GCT	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Barneson	GYW	250	A. Weir & Co.	300, 600	P G	X	0.40	—
Baroda "	GDL	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Baron Erskine "	MHF	250	Hogarth Shipping Co.	300, 600	P G	X	0.40	—
Baron Jedburgh "	MGD	250	Hogarth Shipping Co.	300, 600	P G	X	0.40	—
Baron Napier ..	MJS	250	Hogarth Shipping Co.	300, 600	P G	X	0.40	—
Barpeta ..	MPR	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Barranca	MLL	150	Elders & Fyffes	300, 600	P G	X	0.40	—
Basilisk	BII	—	Navy	—	O ..	—	—	—
Bayano "	GMK	250	Elders & Fyffes	300, 600	P G	X	0.40	—
Beacon Grange "	GFG	250	Houlder Line	300, 600	P G	X	0.40	—
Beagle ..	BIJ	—	Navy	—	O ..	—	—	—
Beaver	BIK	—	Navy	—	O ..	—	—	—
Bellerophon, BAG	BAG	—	Navy	—	O ..	—	—	—
Bellerophon, GTD	GTD	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Bellona	BHF	—	Navy	—	O ..	—	—	—
Beltana "	MKR	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Bempton	MHS	100	Hull Steam Fishing & Ice Co.	300, 600	P ..	X	0.05	—
Benalla "	GBJ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Benbow ..	BAH	—	Navy	—	O ..	—	—	—
Benefactor	MOE	250	T. & J. Harrison	300, 600	P G	X	0.40	—
Ben-my-Chree "	MBQ	66	Isle of Man Steam Packet Co.	300	P R	N	0.05	0.50
Berbice "	GIF	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Bermudian "	MBD	200	Quebec S.S. Co.	300, 600	P G	N	0.40	—
Berrima "	MFF	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Berwick	BDC	—	Navy	—	O ..	—	—	—
Berwick Castle "	GFJ	250	Union Castle	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*cont.*							Francs.	Francs.
Berwindmoor [44]	GFK	250	Havana Coal Co.	300, **600**	P G	X	0.40	—
Berwindvale [44]	GFR	250	Havana Coal Co.	300, **600**	P G	X	0.40	—
Birmingham, BEY	BEY	—	Navy	—	O	—	—	—
Bittern	BIL	—	Navy	—	O	—	—	—
Black Prince	BDD	—	Navy	—	O	—	—	—
Blake	BPC	—	Navy	—	O	—	—	—
Blanca (La) [44]	GJR	250	Argentine Cargo Line	300, **600**	P G	X	0.40	—
Blanche	BHG	—	Navy	—	O	—	—	—
Blenheim	BPD	—	Navy	—	O	—	—	—
Bloemfontein [44]	GBN	150	Bucknall S.S. Lines	300, **600**	P G	N	0.40	—
Blonde	BHH	—	Navy	—	O	—	—	—
Boadicea	BHI	—	Navy	—	O	—	—	—
Bogota [44]	GFS	250	Pacific Steam Nav. Co.	300, **600**	P G	N	0.40	—
Bohemian [44]	MEL	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Bolton Castle [44]	MAQ	150	Lancashire Shipping Co.	300, **600**	P G	X	0.40	—
Bonaventure	BPE	—	Navy	—	O	—	—	—
Borda, MFQ [44]	MFQ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Borderer [44]	GCL	150	Border Union S.S. Co.	300, **600**	P G	X	0.40	—
Borneo [44]	GFT	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Botanist [44]	MAP	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Bovic [44]	GDO	250	White Star Line	300, **600**	P G	X	0.40	—
Boyne	BIM	—	Navy	—	O	—	—	—
Braemar Castle [44]	GFU	250	Union Castle	300, **600**	P G	N	0.40	—
Bramle	BPQ	—	Navy	—	O	—	—	—
Brighton	MOV	95	L.B. & S.C. Railway Co.	300, **600**	P G	N	—	—
Brilliant	BEZ	—	Navy	—	O	—	—	—
Brisk	BIN	—	Navy	—	O	—	—	—
Bristol	BFA	—	Navy	—	O	—	—	—
Britannia, BAI	BAI	—	Navy	—	O	—	—	—
Britannia, GFV	GFV	140	Eastern Telegraph Co.	300, **600**	P	—	0.40	—
British Sun [44]	MGT	110	British Sun Co.	300, **600**	P	—	—	—
Britomart	BPR	—	Navy	—	O	—	—	—
Briton	MQI	250	Union Castle	300, **600**	P G	N	0.40	—
[illegible]	[illegible]	150	Blue Star Line	[illegible]	P G	X	0.40	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—

...ndog	BIO					p.m. to 10 p.m.		
Bulwark	BAJ	—	Navy	—	O	—	—	—
Burma	BQL	—	Navy	—	O	—	—	—
Burutu [44]	MZU	250	Elder Dempster	—	O	—	—	—
Byron [44]	GDH	250	Lamport & Holt	300, 600	P G	N	0.40	—
C. A. Canfield [44]	GIV	150	Petroleum Carriers, Ltd.	300, 600	P G	N	0.40	—
Cadmus	BQB	—	Navy	300, 600	P G	X	0.40	—
Cæsar	BAK	—	Navy	—	O	—	—	—
Cæsarea [44]	MSZ	250	London & South Western Railway	—	O	—	—	—
Calabria, MAJ [44]	MAJ	250	Anchor Line	300, 600	P G	N	0.15	1 50
Caledonia, MAI [44]	MAI	250	Anchor Line	300, 600	P G	N	0.40	—
Caledonia, MNU [44]	MNU	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Caledonian [44]	MDT	250	F. Leyland & Co.	300, 600	P G	X	0.40 [60]	— [60]
Calgarian	MJU	250	Allan Line	300, 600	P G	X	0.40	—
Caliban	MGS	100	Hellyers Steam Fishing Co.	300, 600	P G	N	0.40	—
California, MCI [44]	MCI	250	Anchor Line	300, 600	P	X	0.05	—
California, MWH [44]	MWH	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—
Californian [44]	MWL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Calypso [44]	GFY	250	T. Wilson Sons & Co.	300, 600	P G	N	0.40	—
Cambria, GRG	GRG	170	London & North Western Railway	300, 600	P G	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [44]	0.90 [44]
Cambria, MCG	MCG [186]	140	Eastern Telegraph Co.	300, 600	P G	N	0.05	0.50
Cambrian, BFB	BFB	—	Navy	300, 600	P	—	0.40	—
Cambrian, MNT [44]	MNT	250	Wilsons & Furness Leyland Line	—	O	—	—	—
Cameleon	BIP	—	Navy	300, 600	P G	N	0.40	—
Cameronia [44]	MIO	250	Anchor Line	—	O	—	—	—
Campanello	MGU	250	Uranium S.S. Co.	300, 600	P G	N	0.40	—
Campania, MCA [44]	MCA	250	Cunard Line	300, 600	P G	N	0.40	—
Canada, MCF [44]	MCF	250	Dominion Line	300, 600	P G	N	0.40	—
Canadian [44]	MGL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Candia	MPH	200	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Canning [44]	GKG	250	Lamport & Holt	300, 600	P G	X	0.40	—
Canopic [44]	MPC	250	White Star Line	300, 600	P G	X	0.40	—
Canopus	BAL	—	Navy	300, 600	P G	N	0.40	—
Caraquet	MQD	250	Royal Mail Steam Packet Co.	—	O	—	—	—
Cardiganshire [44]	MAU	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Caribbean [44]	GBR	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Carillo	GHQ	250	Tropical Fruit S.S. Co.	300, 600	P G	N	0.40	—
Carisbrook Castle [44]	MOW	250	Union Castle	300, 500, 600	P G	8 a.m. to 8 p.m.	0.40	—
Carmania [44]	MAA	250	Cunard Line	300, 600	P G	N	0.40	—
Carnarvon	BDE	—	Navy	300, 600	P G	N	0.40	—
Carnarvonshire [44]	MZR	250	Royal Mail Steam Packet Co.	—	O	—	—	—
Caronia	MRA	350	Cunard Line	300, 600	P G	N	0.40	—
Carpathia	MPA	250	Cunard Line	300, 600	P G	N	0.40	—
Carpentaria [44]	MHG	250	British India Steam Nav. Co.	300, 600	P G	N	0.40	—
Carsten Bruun	GTK	80	Blacksod Whaling Co.	300, 600	P G	X	0.40	—
				300, 500, 600	P	—	0.25	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Cartago	GHK	250	Tropical Fruit S.S. Co.	300, **600**	P G	N	0.40	—
Carthaginian [44]	MHN	250	Allan Line	300, **600**	P G	N	0.40	—
Cassandra [44]	MED	250	Donaldson Bros.	300, **600**	P G	N	0.40	—
Cassis	MPO	250	Anglo-Saxon Petroleum Co.	300, **600**	P G	X	0.40	—
Castalia [44]	MWZ	250	Anchor Line	300, **600**	P G	X	0.40	—
Catania (s.y.)	MCK	—	Duke of Sutherland	300, **600**	P.G.	X	0.40	—
Cawdor Castle [44]	GFZ	250	Union Castle	300, **600**	P G	X	0.40	—
Cedric [44]	MDC	250	White Star Line	300, **600**	P G	N	0.40	—
Ceiba	GGA	—	Emerald S.S. Co.	Not aware	dismantled			
Celtic, MLC [44]	MLC	250	White Star Line	300, **600**	P G	N	0.40	—
Centurion	BAM	—	Navy	—	O	—	—	—
Ceramic [44]	MCP	250	White Star Line	300, **600**	P G	X	0.40	—
Cernicalo [44]	GDM	150	S. Pearson & Co.	300, **600**	P G	X	0.40	—
Cestrian [44]	MHL	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Cetriania	MOB	150	W. Eadie	300, **600**	P G	X	0.40	—
Cevic [44]	GDQ	250	White Star Line	300, **600**	P G	X	0.40	—
Chagres [44]	GCN	250	Elders & Fyffes	300, **600**	P G	X	0.40	—
Chaleur	GMN	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Challenger	BFC	—	Navy	—	O	—	—	—
Changuinola	MPM	250	Elders & Fyffes	300, **600**	P G	X	0.40	—
Charles E. Harwood [44]	GYU	150	Petroleum Carriers, Ltd.	300, **600**	P G	X	0.40	—
Charybdis	BFD	—	Navy	—	O	—	—	—
Chatham	BFE	—	Navy	—	O	—	—	—
Chaudiere	GDK	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Cheerful	BIQ	—	Navy	—	O	—	—	—
Chelmer	BIR	—	Navy	—	O	—	—	—
Cherwell	BIS	—	Navy	—	O	—	—	—
Cheyenne, GGB [44]	GGB	150	Anglo-American Oil Co.	300, **600**	P G	N	0.40	—
Chignecto	MBV	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Chile	GGC	250	Pacific Steam Nav. Co.	300, **600**	P G	N	0.40	—
Chilka [44]	GGD	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
China, MMU [44]	MMU	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Chinkoa	MKO	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
[illegible]	MLP	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
[illegible]	[illegible]	[illegible]	Navy	[illegible]	O	—	[illegible]	—

[illegible]	[illegible]	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Colombo [44]	GYG	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Corinth [44]	MFE	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Delhi [44]	GIC	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Dunkirk [44]	GDD	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Durham [44]	GET	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Edinburgh [44]	GNC	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Glasgow [44]	GEU	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Karachi [44]	GBW	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Lahore [44]	GEN	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Lincoln [44]	GDP	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of London [44]	GEV	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Madras [44]	MCY	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Marseilles [44]	GEW	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Naples [44]	GEO	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Norwich [44]	GYA	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Paris [44]	GER	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Poona [44]	GBB	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of York [44]	GAO	250	Ellerman Lines	300, 600	P G	N	0.40	—
Clearway	MYH	250	Anglo-Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Clement [44]	MDB	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Clio	BQC	—	Navy	—	O	—	—	—
Cluny Castle [44]	GGE	250	Union Castle	300, 600	P G	X	0.40	—
Cobequid	MQY	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Cochrane	BDF	—	Navy	—	O	—	—	—
Cockatrice	BIU	—	Navy	—	O	—	—	—
Coconada [44]	GGF	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Colchester	GPH	130	Great Eastern Railway	300, 450, 600 [46]	P R [47]	N	0.10	1.00
Collingwood	BAN	—	Navy	—	O	—	—	—
Colne	BIV	—	Navy	—	O	—	—	—
Colonia, MCL	MCL	140	Telegraph Construction & Maintenance Co.	300, 600	P	—	—	—
Colonian [44]	MGW	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Colorado	MMS	250	Wilson Line	300, 600	P G	X	0.40	—
Colossus	BAO	—	Navy	—	O	—	—	—
Columbia	MFH	200	Hellyers Steam Fishing Co.	300, 600	P	X	0.05	—
Columbia, MOI [44]	MOI	250	Anchor Line	300, 600	P G	N	0.40	—
Columbian [44]	MNV	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Colusa ...	GBI	—	New York & Pacific S.S. Co.	300, 600	P G	—	0.40	—
Comanchee [44]	GGG	150	Anglo-American Oil Co.	300, 600	P G	N	0.40	—
Comet	BIW	—	Navy	—	O	—	—	—
Commonwealth, BAP	BAP	—	Navy	—	O	—	—	—
Commonwealth, GGH [44]	GGH	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Comrie Castle [44]	GGI	250	Union Castle	300, 600	P G	X	0.40	—
Connaught [444]	MCU	140	City of Dublin Steam Packing Co.	300, 600	P G	N	0.05	0.50
Conqueror	BAQ	—	Navy	—	O	—	—	—
Conqueror (s.y.) [44]	GID	150	Duke of Manchester	300, 600	P G	X	0.40	—
Contest ...	BIX	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum. Charge
GREAT BRITAIN—*contd.*							Francs.	Francs.
Copenhagen	GPI	130	Great Eastern Railway	300, 450, **600** [44]	P R [67]	N	0.10	1.00
Corcovado	MIE	250	Pacific Steam Navigation Co. ..	300, **600**	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Cordobes (El) [44]	MHO	250	British & Argentine Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Corinthian [44]	MKN	250	Allan Line	300, **600**	P G ..	N	0.40	—
Corinthic [44]	MWT	250	White Star Line	300, **600**	P G ..	X	0.40	—
Cormorant	MFJ	140	Western Telegraph Co.	300, **600**	P	—	—	—
Cornishman [44]	GDW	250	Dominion Line	300, **600**	P G ..	X	0.40	—
Cornwall	BDG	—	Navy	—	O	—	—	—
Cornwallis	BAR	—	Navy	—	O	—	—	—
Correntina (La) [44]	GJT	250	Houlder Line	300, **600**	P G ..	X	0.40	—
Corsican [44]	MCN	250	Allan Line	300, **600**	P G ..	N	0.40	—
Cossack	BIY	—	Navy	—	O	—	—	—
Crescent	BEJ	—	Navy —	—	O	—	—	—
Cressy	BDH	—	Navy	—	O	—	—	—
Cretic	MRC	250	White Star Line	300, **600**	P G ..	N	0.40	—
Crofton Hall [44]	GAL	250	C. G. Dunn & Co.	300, **600**	P G ..	N	0.40	—
Crown of Toledo	MHV	250	Crown S.S. Co.	300, **600**	P G ..	X	0.40	—
Crown Point [44]	GHM	250	Norfolk & North America S.S Co.	300, **600**	P G ..	X	0.40	—
Crusader	BIZ	—	Navy	—	O	—	—	—
Cufic [44]	GDR	250	White Star Line	300, **600**	P G ..	X	0.40	—
Cumberland	BDI	—	Navy	—	O	—	—	—
Custodian [44]	GCE	250	T. & J. Harrison	300, **600**	P G ..	X	0.40	—
Cyclops, BON	BON	—	Navy	—	O	—	—	—
Cyclops, GTF	GTF	90	A. Holt & Co.	300, 450, **600**	P G ..	X	0.40	4.00
Cymric [44]	MGC	150	White Star Line	300, **600**	P G ..	N	0.40	—
Dacia, GUY	GUY	145	India Rubber, Etc., Works Co. ..	300, **600**	P	—	—	—
Dakar [44]	GCO	250	Elder Dempster	300, **600**	P G ..	N	0.40	—
Danube [44]	MBM	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Daring	BJA	—	Navy	—	O	—	—	—
Darro [44]	GGJ	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Dartmouth	BFF	—	Navy	—	O	—	—	—
Dee	BJB	—	Navy	—	O	—	—	—
Defence	BDJ	—	Navy	—	O	—	—	—
[illegible]	[illegible]	—	Navy	—	O	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N	[illegible]	—

			Co.					
Demerara [44]	GGN	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Demosthenes [44]	MGK	250	Aberdeen Line	300, 600	P G	N	0.40	—
Denbigh Hall [44]	GOW	150	Ellerman Lines	300, 600	P G	N	0.40	—
Denbighshire	MPG	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Denis [44]	MDE	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Den of Airlie [44]	GBK	150	Chas. Barry & Son	300, 600	P G	N	0.40	—
Den of Crombie [44]	GBL	150	Chas. Barry & Son	300, 600	P G	N	0.40	—
Den of Glamis [44]	GBM	150	Chas. Barry & Son	300, 600	P G	N	0.40	—
Den of Ogil	MPU	250	Chas. Barrie & Son	300, 600	P G	X	0.40	—
Den of Ruthven [44]	GYC	150	Chas. Barry & Son	300, 600	P G	N	0.40	—
Derbyshire [44]	MYB	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—
Derwent, BJD	BJD	—	Navy	—	O	—	—	—
Desabla	GYV	250	A. Weir & Co.	300, 600	P G	X	0.40	—
Deseado [44]	GGL	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Desna [44]	GGM	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Devanha [44]	MOU	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Devonian [44]	MDL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Devonshire	BDK	—	Navy	—	O	—	—	—
Dewa [44]	GAK	150	James Nourse, Ltd.	300, 600	P G	X	0.40	—
Diadem	BEK	—	Navy	—	O	—	—	—
Diamond	BGP	—	Navy	—	O	—	—	—
Diana	BFG	—	Navy	—	O	—	—	—
Dido	BFH	—	Navy	—	O	—	—	—
Dieppe	MRL	80	L.B. & S.C. Railway Co.	300, 600	P G	N	—	—
Digby [44]	MNG	250	Furness Withy & Co.	300, 600	P G	X	0.40	—
Dominion, BAT	BAT	—	Navy	—	O	—	—	—
Dominion, MDF [44]	MDF	250	Dominion Line	300, 600	P G	N	0.40	—
Donegal, BDL	BDL	—	Navy	—	O	—	—	—
Donegal, GPO	GPO	150	Midland Railway Co.	300, 400, 600 [44]	P R [45]	N	0.05	0.50
Dongola [44]	MNH	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Doon	BJE	—	Navy	—	O	—	—	—
Doris, BFI	BFI	—	Navy	—	O	—	—	—
Dorset	GRY	320	Federal Steam Nav. Co.	300, 450, 600	P G	N	0.40	—
Dover Castle [44]	MQM	250	Union Castle	300, 600	P G	N	0.40	—
Dragon	BJF	—	Navy	—	O	—	—	—
Drake	BDM	—	Navy	—	O	—	—	—
Dreadnought	BAU	—	Navy	—	O	—	—	—
Dresden, GPM	GPM	130	Great Eastern Railway	300, 450, 600 [44]	P R [47]	N	0.10	1.00
Drina [44]	GGO	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Druid, BJG	BJG	—	Navy	—	O	—	—	—
Drumcliffe [44]	GOS	250	J. Chadwick & Sons	300, 600	P G	X	0.40	—
Drumcree [44]	GCP	250	J. Chadwick & Sons	300, 600	P G	X	0.40	—
Drumlanrig [44]	GDE	250	J. Chadwick & Sons	300, 600	P G	X	0.40	—
Dublin	BFJ	—	Navy	—	O	—	—	—
Duchess of Devonshire	GPP	150	Midland Railway Co.	300, 400, 600	P G	N	0.05	—
Duendes [44]	GGP	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—
Duke of Edinburgh	BDN	—	Navy	—	O	—	—	—
Duncan	BAV	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Dunluce Castle [44]	MQO	250	Union Castle	300, **600**	P G	N	0.40	—
Dunvegan Castle [44]	MPQ	250	Union Castle	300, **600**	P G	N	0.40	—
Durham	GQC	300	Federal Steam Nav. Co.	300, **600**	P G	N	0.40	—
Durham Castle [44]	MQN	250	Union Castle	300, **600**	P G	N	0.40	—
Eagle Point [44]	GKI	250	Norfolk & North America S.S. Co.	300, **600**	P G	X	0.40	—
East Point [44]	GHJ	250	Norfolk & North America S.S. Co.	300, **600**	P G	X	0.40	—
Eclipse	BFK	—	Navy	—	O	—	—	—
Edavana [44]	GGQ	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Eden	BJH	—	Navy	—	O	—	—	—
Edgar	BEL	—	Navy	—	O	—	—	—
Edinburgh Castle [44]	MQE	250	Union Castle	300, **600**	P G	N	0.40	—
Edward L. Doheny [44]	GYR	150	Petroleum Carriers, Ltd.	300, **600**	P G	X	0.40	—
Egra [44]	GGR	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Egypt [44]	MMG	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Eileen (S. Y.) [44]	GAN	200	J. B. Joel	300, **600**	P G	X	0.40	—
Ekma [44]	GGS	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Electra	MEE	140	Eastern Telegraph Co.	300, **600**	P	—	0.40	—
Elephanta [44]	GGU	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Ellenga [44]	GGV	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Ellora [44]	GGW	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Elmina [44]	MZI	250	Elder, Dempster	300, **600**	P G	N	0.40	—
Elysia [44]	MRH	250	Anchor Line	300, **600**	P G	X	0.40	—
Empress	GUI	50	South Eastern & Chatham Railway	300, **600**	P G	N	0.15 [88]	1.50 [88]
Empress of Asia [44]	GKR	250	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Empress of Britain [44]	MPB	250	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Empress of India, BAW	BAW	—	Navy	—	O	—	—	—
Empress of India, MPI [44]	MPI	250	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Empress of Ireland [44]	MPL	250	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Empress of Japan [44]	MPJ	250	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Empress of Russia [44]	MRD	250	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Empress Queen [44]	MEQ	66	Isle of Man Steam Packet Co.	300	P R [48]	N	0.05	0.50
Enchantress	BQG	—	Navy	—	O	—	—	—
Encounter, BPL	BPL	—	Navy	—	O	—	—	—
Endeavour	BPL	—	Navy	—	O	—	—	—
Endymion	BEM	—	Navy	—	O	—	—	—
Engadine	GUK	50	South Eastern & Chatham Railway	300, **600**	P G	N	0.15	1.50
Engineer [44]	MEO	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

						p.m. to 7 p.m., 8 p.m. to 12 p.m.		
Esmeraldas [44]	GHF	250	Pacific Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Espiegle	BQD	—	Navy	—	O ..	—	—	—
Essex, BDO	BDO	—	Navy	—	O ..	—	—	—
Etonian [44]	MFD	250	Wilsons & Furness-Leyland Line	300, 600	P G ..	N	0.40	—
Ettrick	BJJ	—	Navy	—	O ..	—	—	—
Eupion	MKT	150	Eupion S.S. Co.	300, 600	P G ..	X	0.40	—
Europa, BEN	BEN	—	Navy	—	O ..	—	—	—
Euryalus	BDP	—	Navy	—	O ..	—	—	—
Exe	BJK	—	Navy	—	O ..	—	—	—
Exmouth	BAX	—	Navy	—	O ..	—	—	—
Exmouth II. [44]	GYF	150	Metropolitan Asylums Board ..	300, 600	P ..	X	0.40	—
Falaba [44]	MZK	250	Elder, Dempster	300, 600	P G ..	N	0.40	—
Falmouth	BFM	—	Navy	—	O ..	—	—	—
Faraday	GTP	290	Siemens Bros. & Co.	300, 450, 600	P G ..	X	0.40	—
Fauvette	GTA	90	General Steam Nav. Co.	300, 600	P G ..	X [u]	0.40	—
Fearless..	BHJ	—	Navy	—	O ..	—	—	—
Ferret	BJL	—	Navy	—	O ..	—	—	—
Filey	MGY	100	Hull Steam Fishing & Ice Co. ..	300, 600	P ..	X	0.05	—
Firedrake	BJM	—	Navy	—	O ..	—	—	—
Flamenco [44]	GHG	250	Pacific Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Flora	BFN	—	Navy	—	O ..	—	—	—
Florizel, BJN	BJN	—	Navy	—	O ..	—	—	—
Florizel, MZL [44]	MZL	250	Bowring Line	300, 600	P G ..	N	0.40	—
Foresight	BHM	—	Navy	—	O ..	—	—	—
Forester	BJO	—	Navy	—	O ..	—	—	—
Formidable	BAY	—	Navy	—	O ..	—	—	—
Forte	BFO	—	Navy	—	O ..	—	—	—
Forth	BPF	—	Navy	—	O ..	—	—	—
Fortune..	BJP	—	Navy	—	O ..	—	—	—
Forward	BHN	—	Navy	—	O ..	—	—	—
Fox	BFP	—	Navy	—	O ..	—	—	—
Foxhound	BJQ	—	Navy	—	O ..	—	—	—
Foyle	BJR	—	Navy	—	O ..	—	—	—
Francis [44]	MDG	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—
Francisco [44]	GHI	250	T. Wilson Sons & Co.	300, 600	P G ..	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Franconia [44]	MEA	350	Cunard Line	300, 600	P G ..	N	0.40	—
Fury	BJS	—	Navy	—	O ..	—	—	—
Gaika [44]..	MQU	250	Union Castle	300, 600	P G ..	N	0.40	—
Galeka [44]	MQR	250	Union Castle	300, 600	P G ..	N	0.40	—
Galicia [44]	GIG	250	Pacific Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Galician [44]	MQT	250	Union Castle	300, 600	P G ..	N	0.40	—
Galileo [44]	GII	250	T. Wilson Sons & Co.	300, 600	P G	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Galway Castle [44]	MPY	250	Union Castle	300, 600	P G ..	N	0.40	—
Garland..	BJT	—	Navy	—	O ..	—	—	—
Garry	BJU	—	Navy	—	O ..	—	—	—
Garth Castle [44]	MQP	250	Union Castle[1]	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Gascon "	MQV	250	Union Castle	300, **600**	P G	N	0.40	—
Geelong "	GIJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Georgian "	MFI	250	Wilsons & Furness-Leyland Line	300, **600**	P G	N	0.40	—
Georgic "	GDT	250	White Star Line	300, **600**	P G	X	0.40	—
German "	MQS	250	Union Castle	300, **600**	P G	N	0.40	—
Ghazee "	GAV	150	Gellatly, Hankey & Co.	300, **600**	P G	X	0.40	—
Ghurka	BJV	—	Navy	—	O	—	—	—
Gibraltar	BEO	—	Navy	—	O	—	—	—
Glasgow	BFQ	—	Navy	—	O	—	—	—
Glory	BAZ	—	Navy	—	O	—	—	—
Gloucester, BFR	BFR	—	Navy	—	O	—	—	—
Gloucester Castle "	MQZ	250	Union Castle	300, **600**	P G	N	0.40	—
Gloucestershire "	MYG	250	Bibby Bros. & Co.	300, **600**	P G	X	0.40	—
Goldfinch	BIW	—	Navy	—	O	—	—	—
Goliath, BBA	BBA	—	Navy	—	O	—	—	—
Good Hope	BDQ	—	Navy	—	O	—	—	—
Goorkha "	MQW	250	Union Castle	300, **600**	P G	N	0.40	—
Goshawk	BJX	—	Navy	—	O	—	—	—
Grafton	BEP	—	Navy	—	O	—	—	—
Grampian "	MRN	250	Allan Line	300, **600**	P G	N	0.40	—
Grantully Castle "	MQQ	250	Union Castle	300, **600**	P G	N	0.40	—
Grasshopper	BJY	..	Navy	—	O	—	—	—
Glenetive "	MEZ	250	Caledonia S.S. Co.	300, **600**	P G	X	0.40	—
Great City	MKW	250	R.. W. Smith & Sons	300, **600**	P G	X	0.40	—
Greyhound	BJZ	—	Navy	—	O	—	—	—
Grive	GQI	90	General Steam Nav. Co., Ltd.	300, **600**	P G	X	0.40	—
Guatemala "	MWM	250	Pacific Steam Nav. Co.	300, **600**	P G	N	0.40	—
Guildford Castle "	MPZ	250	Union Castle	300, **600**	P G	N	0.40	—
Guiana "	MBH	200	Quebec S.S. Co.	300, **600**	P G	N	0.40	—
Gujarat	GBO	250	A. Weir & Co.	300, **600**	P G	X	0.40	—
Halcyon	BPS	—	Navy	—	O	—	—	—
Hampshire	BDR	—	Navy	—	O	—	—	—
Hannibal, BBC	BBC	—	Navy	—	O	—	—	—
Hantonia "	GIL	250	London & South Western Railway	300, **600**	P G	N	0.15	1.50
Hardy	BKA	—	Navy	—	O	—	—	—
Harpy	[illegible]	—	[illegible]	—	O	—	—	—
Hatumet "	[illegible]	[illegible]	[illegible] Co.	[illegible]	P G	X	0.40	—

Hawke	BEQ	—	Navy	—	O	—	—	—
Hawkes Bay "	GAJ	250	Tyser Line	300, 600	P G ..	X	0.40	—
Hazard	BOW	—	Navy	—	O	—	—	—
Hebe	BOX	—	Navy	—	O	—	—	—
Hecla	BOS	—	Navy	—	O	—	—	—
Herbert G. Wylie "	GAT	150	Petroleum Carriers, Ltd.	300, 600	P G ..	X	0.40	—
Hercules	BBD	—	Navy	—	O	—	—	—
Heredia	GHR	250	Tropical Fruit S.S. Co.	300, 400, 600	P G ..	7 a.m. to 9 p.m.	0.40	—
Herefordshire "	MYA	250	Bibby Bros. & Co...	300, 600	P G ..	X	0.40	—
Hereward	BKE	—	Navy	—	O	—	—	—
Hermes	BFS	—	Navy	—	O	—	—	—
Hermione, BFT	BFT	—	Navy	—	O	—	—	—
Hermione, GIN "	GIN	250	British & S. American Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Hesperian "	MSN	250	Allan Line	300, 600	P G ..	N	0.40	—
Hesperides, GIO "	GIO	250	British & S. American Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Hibernia, BBE	BBE	—	Navy	—	O	—	—	—
Hibernia, GRW	GRW	170	London & North Western Railway	300, 600	P G ..	N	0.05	0.50
Highflyer	BFU	—	Navy	—	O	—	—	—
Highland Brae "	GIP	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Brigade "	MCZ	250	Nelson Line	300, 600	P G ..	X	0.40	—
Highland Corrie "	GIQ	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Enterprise " ..	MDA	250	Nelson Line	300, 600	P G ..	X	0.40	—
Highland Glen "	GIR	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Harris "	MDO	250	Nelson Line	300, 600	P G ..	X	0.40	—
Highland Heather "	MEK	250	Nelson Line	300, 600	P G ..	X	0.40	—
Highland Hope "	MEO	250	Nelson Line	300, 600	P G ..	X	0.40	—
Highland Laddie "	GIU	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Laird "	MEP	250	Nelson Line	300, 600	P G ..	X	0.40	—
Highland Loch "	GIY	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Piper "	GNM	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Pride "	GJA	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Rover "	GJB	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Scot "	GJC	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Warrior "	GJD	250	Nelson Line	300, 600	P G ..	N	0.40	—
Highland Watch "	MER	250	Nelson Line	300, 600	P G ..	X	0.40	—
Hilary "	MDP	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—
Hildebrand, MDM "	MDM	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—
Himalaya "	MNY	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Hind	BKF	—	Navy	—	O	—	—	—
Hindustan	BBF	—	Navy	—	O	—	—	—
Historian	MHT	250	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Hogue	BDS	—	Navy	—	O	—	—	—
Honorius "	GJE	250	British & South American Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Hope	BKG	—	Navy	—	O	—	—	—
Horley	MRJ	200	Inter-Ocean Transportation Co.	300, 600	P G ..	—	0.40	—
Hornet	BKH	—	Navy	—	O	—	—	—
Hororata	MRF	250	New Zealand Shipping Co. ..	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Hotspur	BKI	—	Navy	—	O	—	—	—
Huanchaco "	GJF	250	Pacific Steam Nav. Co.	300, **600**	P G	N	0.40	—
Huayna "	MDV	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Hubert "	MDH	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Huntsman "	GLB	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Hurunui	GCO	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Hussar	BPT	—	Navy	—	O	—	—	—
Hyacinth	BFV	—	Navy	—	O	—	—	—
Hyacinthus "	GJG	250	British & South America Steam Nav. Co.	300, **600**	P G	X	0.40	—
Hydaspes "	GJH	250	British & South America Steam Nav. Co.	300, **600**	P G	X	0.40	—
Hydra, BKJ	BKJ	—	Navy	—	O	—	—	—
Hypatia "	GJI	250	British & South America Steam Nav. Co.	300, **600**	P G	X	0.40	—
Iberian "	MHA	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Idaho, GJJ "	GJJ	250	T. Wilson Sons & Co.	300, **600**	P G	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Illustrious	BBG	—	Navy	—	O	—	—	—
Implacable	BBH	—	Navy	—	O	—	—	—
Inanda "	MID	250	T. & J. Harrison	300, **600**	P G	N	0.40	—
Inca	MIF	250	Pacific Steam Navigation Co.	300, **600**	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Indefatigable	BCO	—	Navy	—	O	—	—	—
India "	MMY	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Indian, MHB "	MHB	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Indomitable	BCP	—	Navy	—	O	—	—	—
Indore "	GMI	250	Gulf Transport Co.	300, **600**	P G	X	0.40	—
Indra	GSZ	175	Indra Line	300, **600**	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indrabarrah	MOT	250	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—
Indradeo	GSY	175	Indra Line	300, **600**	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indraghiri	[illegible]	175	Indra Line	300, **600**	P	9 a.m. to 11 a.m., 9 [illegible]	—	—

Indrani	GSW	175	Indra Line	300, 600	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indrapura [44]	GCR	250	Indra Line	300, 600	P G	N	0.40	—
Indus	MCR	150	J. Nourse, Ltd	300, 600	P G	X	0.40	—
Inflexible	BCQ	—	Navy	—	O	—	—	—
Ingoma [44]	GDV	250	T. & J. Harrison	300, 600	P G	N	0.40	—
Inkosi [44]	MIK	250	T. & J. Harrison	300, 600	P G	N	0.40	—
Intaba [44]	MIP	250	T. & J. Harrison	300, 600	P G	N	0.40	—
Intrepid	BPG	—	Navy	—	O	—	—	—
Invicta	GUL	50	South Eastern & Chatham Railway	300, 600	P G	N	0.15 [60]	1.50 [60]
Invincible	BCR	—	Navy	—	O	—	—	—
Ionian [44]	MIN	250	Allan Line	300, 600	P G	N	0.40	—
Ionic [44]	MWI	250	White Star Line	300, 600	P G	X	0.40	—
Iphigenia	BQT	—	Navy	—	O	—	—	—
Irishman [44]	GJK	250	White Star Line	300, 600	P G	X	0.40	—
Iron Duke	BBI	—	Navy	—	O	—	—	—
Iroquois, MEI	MEI	150	Anglo-American Oil Co.	300, 600	P	—	0.40	—
Irresistible	BBJ	—	Navy	—	O	—	—	—
Isis, BFW	BFW	—	Navy	—	O	—	—	—
Isis, GAP [44]	GAP	250	Peninsular & Oriental	300, 600	P G	X	0.40	—
Italia, MAR [44]	MAR	250	Anchor Line	300, 600	P G	N	0.40	—
Itchen	BKK	—	Navy	—	O	—	—	—
Ivanhoe	BKL	—	Navy	—	O	—	—	—
Ivernia [44]	MIA	250	Cunard Line	300, 600	P G	N	0.40	—
Invertay [44]	MAT	250	Leslie, Law & Co.	300, 600	P G	X	0.40	—
Ixion	GRZ	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Jabberwock	GNN	10	H. Merton, London	150, 300	P	—	—	—
Jackal	BKM	—	Navy	—	O	—	—	—
Jason	BPU	—	Navy	—	O	—	—	—
Jed	BKN	—	Navy	—	O	—	—	—
John Pender	MEF	140	Eastern Telegraph Co.	300, 600	P	—	0.40	—
Jose de Larrinaga [44]	GAU	250	Miguel de Larrinaga S.S. Co.	300, 600	P G	X	0.40	—
Junin [44]	GJL	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—
Juno	BFX	—	Navy	—	O	—	—	—
Jupiter	BBK	—	Navy	—	O	—	—	—
Kabinga [44]	GEI	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Kafue [44]	MRT	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Kale	BKO	—	Navy	—	O	—	—	—
Kalomo [44]	GBY	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Kanakuk	GTM	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Kanawha [44]	MNL	250	Furness Withy & Co.	300, 600	P G	X	0.40	—
Kandahar [44]	MAB	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Kansas, MRW [44]	MRW	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Kaikoura	MRS	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Kaipara [44]	GYP	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Karema [44]	MAF	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Karina [44]	MZJ	250	Elder, Dempster	300, 600	P G	N	0.40	—
Karonga [44]	GEJ	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Karroo [44]	GNS	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—
Kasama [44]	GBP	150	Bucknall S.S. Lines	300, 600	P G	N	0.40	—
Kasenga [44]	GEK	150	Bucknall S.S. Lines	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Kastalia	MNI	250	Donaldson Bros.	300, **600**	P G	X	0.40	—
Kathiawar	GEM	250	A. Weir & Co.	300, **600**	P G	X	0.40	—
Kathlamba [44]	GLF	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Katuna [44]	GEH	150	Bucknall SS. Lines	300, **600**	P G	X	0.40	—
Kazembe [44]	GYQ	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Keelung	MFP	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Keemun	GTQ	90	A. Holt & Co.	300, 450, **600**	P G	X	0.40	4.00
Kelvinbank [44]	GJM	150	J. Black & Co.	300, **600**	P G	X	0.40	—
Kelvindale	GJN	150	J. Black & Co.	300, **600**	P G	X	0.40	—
Kelvinia	MGQ	250	J. Black & Co.	300, **600**	P G	X	0.40	—
Kenilworth Castle [44]	MQF	250	Union Castle	300, **600**	P G	N	0.40	—
Kennet	BKP	—	Navy	—	O	—	—	—
Kent	BDT	—	Navy	—	O	—	—	—
Kent	MOP	150	Federal Steam Nav. Co.	300, **600**	P G	X	0.40	—
Kentra [44]	GAW	150	Isthmian S.S. Co.	300, **600**	P G	X	0.40	—
Kentucky, GDN [44]	GDN	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Kenuta [44]	GJO	250	Pacific Steam Nav. Lines	300, **600**	P G	N	0.40	—
Khiva [44]	MGZ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Khyber	MCE	250	P. & O.	300, **600**	P G	X	0.40	—
Kia Ora [44]	GJP	250	Shaw Savill & Albion	300, **600**	P G	X	0.40	—
Kildonan Castle [44]	MQK	250	Union Castle	300, **600**	P G	N	0.40	—
Kinfauns Castle [44]	MQL	250	Union Castle	300, **600**	P G	N	0.40	—
King Alfred	BDU	—	Navy	—	O	—	—	—
King Edward VII.	BBL	—	Navy	—	O	—	—	—
King George V.	BBM	—	Navy	—	O	—	—	—
King Orry [44]	MPE	100	Isle of Man Steam Packet Co.	300, **600**	P G	N	0.05	0.50
Knight Bachelor	MRE	250	Knight Steamship Co.	300, **600**	P G	X	0.40	—
Knight Companion [44]	GKS	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Knight of the Thistle [44]	GMG	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Knight Templar [44]	GKT	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Kingstonian [44]	MHM	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Kioto [44]	GEZ	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Kohistan	GOK	90	Strick Line	300, **600**	P G	X	0.40	—
Koranna [44]	GYY	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Korona	MBI	200	Quebec S.S. Co.	300, **600**	P G	N	0.40	—
Kumara [44]	[illegible]	250	Shaw, Savill & Albion	300, **600**	P G	X	0.40	—
Kumeric [44]	[illegible]	250	Andrew Weir & Co.	300, **600**	P G	N	[illegible]	—

Lady Crundall	GQR	90	Dover Harbour Board	150, 300	P	X	—	—
Lake Manitoba [44]	MLM	150	Canadian Pacific Railway ..	300, 600	P G ..	N	0.40	—
Lake Michigan [44]	MLH	150	Canadian Pacific Railway ..	300, 600	P G ..	N	0.40	—
Lancaster	BDV	—	Navy	—	O	—	—	—
Lancastrian [44]	MBP	250	F. Leyland & Co.	300, 600	P G ..	N	0.40	—
Lanfranc [44]	MDS	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—
Lapwing	BKQ	—	Navy	—	O	—	—	—
Larne	BKR	—	Navy	—	O	—	—	—
Latona	BQU	—	Navy	—	O	—	—	—
Laurentic	MIC	250	White Star Line	300, 600	P G ..	N	0.40	—
Leander..	BOT	—	Navy	—	O	—	—	—
Leda, BPV	BPV	—	Navy	—	O	—	—	—
Leicestershire [44]	MYL	250	Bibby Bros. & Co..	300, 600	P G ..	X	0.40	—
Leinster [44]	MCV	140	City of Dublin Steam Packet Co.	300, 600	P G ..	N	0.05	0.50
Letitia [44]	GKA	250	Donaldson Bros.	300, 600	P G ..	N	0.40	—
Levant II.	GJY	110	Eastern Telegraph Co.	300, 600	P	—	0.40	—
Leviathan	BDW	—	Navy	—	O	—	—	—
Liffey	BKS	—	Navy	—	O	—	—	—
Limerick	MHU	250	New Zealand Shipping Co. ..	300, 600	P G ..	X	0.40	—
Linnet	MKI	150	Liverpool Salvage Association ..	300, 600	P	X	0.40	—
Lion	BCS	—	Navy	—	O	—	—	—
Liverpool	BFY	—	Navy	—	O	—	—	—
Lizard	BKT	—	Navy	—	O	—	—	—
Llandovery Castle [44]	MCO	250	Union Castle	300, 600	P G ..	N	0.40	—
Llanstephen Castle	MJT	250	Union Castle	300, 600	P G ..	N	0.40	—
London	BBN	—	Navy	—	O	—	—	—
Londonderry	GPR	150	Midland Railway Co.	300, 400, 600 [66]	P R [66] ..	N	0.05	0.50
Lord Nelson	BBO	—	Navy	—	O	—	—	—
Lowestott	BFZ	—	Navy	—	O	—	—	—
Lucerie [44]	GJZ	250	Andrew Weir & Co.	300, 600	P G ..	N	0.40	—
Lurcher	BKU	—	Navy	—	O	—	—	—
Lusitania [44]	MFA	250	Cunard Line	110, 300, 600	P G ..	N	0.40	—
Lynx, BKV	BKV	—	Navy	—	O	—	—	—
Lyra	BKW	—	Navy	—	O	—	—	—
Macedonia, MML [44]	MML	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Mackay-Bennett	MMB	250	Commercial Cable Co.	300, 600	P	X	—	—
Magdalena [44]	GUC	250	Royal Mail Steam Packing Co. ..	300, 600	P G ..	N	0.40	—
Magellan	MIH	250	Pacific Steam Navigation Co. ..	300, 600	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Magnet	MEH	140	Eastern Extension Australasian & China Telegraph Co.	300, 600	P	—	0.40	—
Magnificent	BBP	—	Navy	—	O	—	—	—
Maidstone	BOY	—	Navy	—	O	—	—	—
Maine, BQK	BQK	—	Navy	—	O	—	—	—
Majestic, BBQ	BBQ	—	Navy	—	O	—	—	—
Makarini [44]	GKB	250	Tyser Line	300, 600	P G ..	X	0.40	—
Malda [44]	GIS	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Maloja [44]	MKM	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—

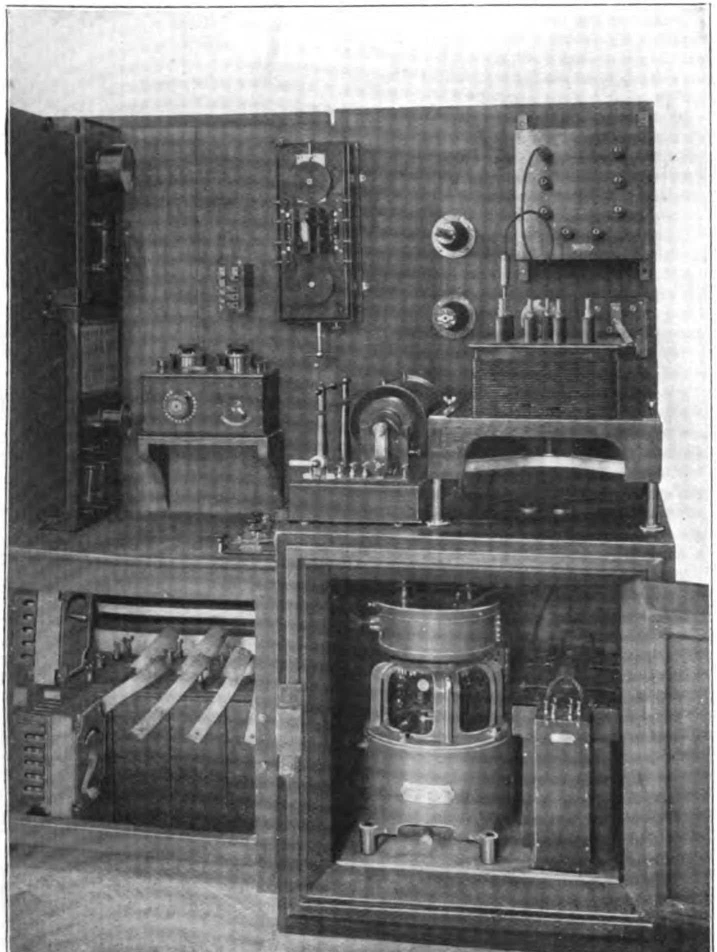
Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Malta [44]	GKD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Malwa [44]	MMD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mamari [44]	GKE	250	Shaw, Savill & Albion	300, **600**	P G	X	0.40	—
Manchester City [44]	GKH	250	Manchester Liners, Ltd.	300, **600**	P G	N	0.40	—
Manhattan [44]	GKK	250	National S.S. Co.	300, **600**	P G	N	0.40	—
Manistee	MLR	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Manitou [44]	MNM	250	Atlantic Trasnport Line	300, **600**	P G	N	0.40	—
Manora [44]	GIT	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mantua [44]	MME	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40 [40]	— [40]
Manxman, GDZ [44]	GDZ	250	Dominion Line	300, **600**	P G	X	0.40	—
Manxman, GPS	GPS	150	Midland Railway Co.	300, 400, **600**	P G	N	0.05	—
Manzanares	MLS	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Maori, BKX	BKX	—	Navy	—	O	—	—	—
Maracas [44]	MFZ	250	Trinidad Shipping & Trading Co.	300, **600**	P G	N	0.40	—
Marathon [44]	MGJ	250	Aberdeen Line	300, **600**	P G	N	0.40	—
Marengo [44]	GKJ	250	T. Wilson Sons & Co.	300, **600**	P G	8 a.m. to 1 p.m., 2 p.m. to 1 p.m., 6 p.m. to 10 p.m.	0.40	—
Marere [44]	MBU	250	Tyser Line	300, **600**	P G	X	0.40	—
Marguerite (La) [44]	GJU	250	Liverpool & North Wales S.S. Co.	300, **600**	P G	N	0.05	0.50
Marina	MNK	250	Donaldson Bros.	300, **600**	P G	X	0.40	—
Marlborough	BBR	—	Navy	—	O	—	—	—
Marmora [44]	MMR	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Marquette [44]	MNQ	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Mars, BBS	BBS	—	Navy	—	O	—	—	—
Martin	BKY	—	Navy	—	O	—	—	—
Maryland, MBW [44]	MBW	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Masconomo	GTR	125	Tank Storage & Carriage Co.	300, **600**	P	X	—	—
Mashobra [44]	GMS	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mashona	GEY	150	Bucknall S.S. Line	300, **600**	P G	X	0.40	—
Massasoit	GTB	125	Tank Storage & Carriage Co.	300, **600**	P	X	—	—
Massilia [44]	MHQ	250	Anchor Line	300, [illegible]	P G	X	0.40	—
Matatua [44]	[illegible]	[illegible]	[illegible] Albion	[illegible]	P G	X	0.40	—
Matina	[illegible]	[illegible]	[illegible]	[illegible]	P G	X	[illegible]	—

Mechanician [44]	GCG	250	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Medea	BGQ	—	Navy	—	O ..	—	—	—
Medic	MKK	250	White Star Line	300, 600	P G ..	X	0.40	—
Medina [44]	MKP	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Megantic [44]	MZC	250	White Star Line	300, 600	P G ..	N	0.40	—
Mekong	GSV	270	V. Morton-Jackson, of Clonmel ..	300, 450, 600	P ..	—	—	—
Melania	MPP	250	Anglo-Saxon Petroleum Co. ..	300, 600	P G ..	X	0.40	—
Melford Hall [44]	GEQ	150	Ellerman Lines	300, 600	P G ..	N	0.40	—
Melpomene	BGA	—	Navy	—	O ..	—	—	—
Mendi [44]	MZM	250	Elder, Dempster	300, 600	P G ..	N	0.40	—
Menominee [44]	MNE	250	Atlantic Transport Line	300, 600	P G ..	N	0.40	—
Mercedes	BQN	—	Navy	—	O ..	—	—	—
Merion [44]	MJM	250	International Nav. Co.	300, 600	P G ..	N	0.40	—
Merkara [44]	GMY	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Mermaid	BKZ	—	Navy	—	O ..	—	—	—
Mersey	MWJ	135	White Star Line	300, 600	P G ..	X	0.40	—
Mesaba [44]	MMV	250	Atlantic Transport Line	300, 600	P G ..	N	0.40	—
Metapan	GHS	250	Tropical Fruit S.S. Co.	300, 400, 600	P G ..	7 a.m. to 9 p.m.	0.40	—
Mexico, MWG [44]	MWG	250	Pacific Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Miami	MLU	150	Elders & Fyffes	300, 600	P G ..	X	0.40	—
Michigan, GKM [44]	GKM	250	National S.S. Co.	300, 600	P G ..	N	0.40	—
Michigan, MOG [44]	MOG	250	White Diamond S.S. Co.	300, 600	P G ..	X	0.40	—
Midge	BLA	—	Navy	—	O ..	—	—	—
Miltiades [44]	MGF	250	Aberdeen Line	300, 600	P G ..	N	0.40	—
Milwaukee [44]	MLF	150	Canadian Pacific Railway Co. ..	300, 600	P G ..	N	0.40	—
Mimiro [44]	MKH	250	Tyser Line	300, 600	P G ..	X	0.40	—
Minerva, BGB	BGB	—	Navy	—	O ..	—	—	—
Minia	GUQ	100	Anglo-American Telegraph Co. ..	300	P ..	N	—	—
Minneapolis [44]	MMN	250	Atlantic Transport Line	300, 600	P G ..	N	0.40	—
Minnehaha [44]	MMA	250	Atlantic Transport Line	300, 600	P G ..	N	0.40	—
Minnetonka [44]	MMK	250	Atlantic Transport Line	300, 600	P G ..	N	0.40	—
Minnewaska [44]	MMW	250	Atlantic Transport Line	300, 600	P G ..	N	0.40	—
Minnie de Larrinaga	MLA	250	Miguel de Larrinaga S.S. Co. ..	300, 600	P G ..	X	0.40	—
Minotaur	BDX	—	Navy	—	O ..	—	—	—
Minstrel..	BLB	—	Navy	—	O ..	—	—	—
Missouri	MLG	250	Atlantic Transport Co.	300, 600	P G ..	X	0.40	—
Mohawk, BLC	BLC	—	Navy	—	O ..	—	—	—
Moldavia [44]	MMH	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Monarch, BBT	BBT	—	Navy	—	O ..	—	—	—
Monarch, GTS (Cable ship) ..	GTS	100	Post Office	300	—	—	—	—
Mongolia [44]	MMJ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Mongolian [44]	MON	250	Allan Line	300, 600	P G ..	N	0.40	—
Monmouth, BDY	BDY	—	Navy	—	O ..	—	—	—
Monmouth, MGV [44]	MGV	150	Canadian Pacific Railway Co. ..	300, 600	P G ..	N	0.40	—
Monmouthshire [44]	GAM	250	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Montcalm, MLZ [44]	MLZ	150	Canadian Pacific Railway Co. ..	300, 600	P G ..	N	0.40	—
Monteagle [44]	MPF	250	Canadian Pacific Railway Co. ..	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Montezuma [44]	MLK	150	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—
Montfort [44]	MLW	150	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—
Montreal, MLI [44]	MLI	150	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—
Montrose [44]	MLJ	150	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—
Mooltan [44]	MMM	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	N	0.40	—
Moravian [44]	MGG	250	Aberdeen Line	300, **600**	P G	N	0.40	—
Morea [44]	MMF	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mosquito	BLD	—	Navy	—	O	—	—	—
Motagua	MPN	250	Elders & Fyffes	300, **600**	P G	X	0.40	—
Moto	MKS	150	Pelton S.S. Co.	300, **600**	P G	X	—	—
Mount Royal [44]	MLO	150	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—
Mount Temple [44]	MLQ	150	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—
Moy	BLE	—	Navy	—	O	—	—	—
Munich	GPJ	130	Great Eastern Railway	300, 450, **600** [43]	P R [47]	N	0.10	1.00
Munster [44]	MCQ	140	City of Dublin Steam Packet Co.	300, **600**	P G	N	0.05	0.50
Muritai [44]	MKF	250	Tyser Line	300, **600**	P G	X	0.40	—
Musician [44]	MAD	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Mutlah	MOA	150	J. Nourse, Ltd.	300, **600**	P G	X	0.40	—
Nagoya [44]	GCD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Naiad	BPH	—	Navy	—	O	—	—	—
Nairnshire	MBE	—	Scottish Shire Line	300, **600**	P G	X	0.40	—
Namur [44]	GKN	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Naneric [44]	GKO	250	Andrew Weir & Co.	300, **600**	P G	N	0.40	—
Nankin [44]	GKP	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Narragansett	MEC	150	Anglo-American Oil Co.	300, **600**	P	—	0.40	—
Narrung [44]	GKQ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	N	0.40	—
Natal	BDZ	—	Navy	—	O	—	—	—
Nautilus, BLF	BLF	—	Navy	—	O	—	—	—
Navahoe	MEN	150	Anglo-American Oil Co.	300, **600**	P	—	0.40	—
Negra (I a) [44]	[illegible]	250	British & Argentine Steam Nav.	300, **600**	P G	X	0.40	—



½ k.w. Wireless Station for Cargo Vessels.

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Nerehana [44]	MCB	250	Tyser Line	300, 600	P G	X	0.40	—
Nereide	BLH	—	Navy	—	O	—	—	—
Ness	BLI	—	Navy	—	O	—	—	—
Nestor [44]	GBQ	250	A. Holt & Co.	300, 600	P G	X	0.40	—
Neuralia [44]	GCV	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Nevasa [44]	GBG	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Newcastle	BGC	—	Navy	—	O	—	—	—
New Londoner [44]	MDQ	150	Tyne & Tees S.S. Co.	300, 600	P G	N	0.15	0.90
New Zealand	BCT	—	Navy	—	O	—	—	—
Niagara, GBE [44]	GBE	250	Union S.S. Co. of New Zealand	300, 600	P G	N	0.40	—
Niceto de Larrinaga [44]	GAZ	250	Miguel de Larrinaga S.S. Co.	300, 600	P G	X	0.40	—
Nicoya	MLV	150	Elders & Fyffes	300, 600	P G	X	0.40	—
Niger	BPW	—	Navy	—	O	—	—	—
Nigeria [44]	MZF	250	Elder, Dempster	300, 600	P G	N	0.40	—
Nile, GKU [44]	GKU	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Nith	BLJ	—	Navy	—	O	—	—	—
Niwaru [44]	MJD	250	Tyser Line	300, 600	P G	X	0.40	—
Nore [44]	GKV	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Norman [44]	MOM	250	Union Castle	300, 600	P G	N	0.40	—
Norman Bridge [44]	MVA	150	Petroleum Carriers, Ltd.	300, 600	P G	X	0.40	—
Normannia, GKW [44]	GKW	250	London & South Western Railway	300, 600	P G	N	0.15	1.50
Norseman, MEG	MEG	140	Western Telegraph Co.	300, 600	P	—	—	—
Norseman, MGH [44]	MGH	250	Aberdeen Line	300, 600	P G	N	0.40	—
North Point [44]	GIW	250	Norfolk & North American S.S. Co.	300, 600	P G	X	0.40	—
Nottingham	BGD	—	Navy	—	O	—	—	—
Novara, GCW [44]	GCW	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Nubia [44]	GKZ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Nubian	BLK	—	Navy	—	O	—	—	—
Numidian [44]	MNN	250	Allan Line	300, 600	P G	N	0.40	—
Nyanza [44]	GKY	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Nymphe, BLL	BLL	—	Navy	—	O	—	—	—
Oak	BLM	—	Navy	—	O	—	—	—
Oania	GTU	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Ocean	BBV	—	Navy	—	O	—	—	—
Oceanic [44]	MOC	250	White Star Line	300, 600	P G	N	0.40	—
Odin, BQE	BQE	—	Navy	—	O	—	—	—
Olympia	BQO	—	Navy	—	O	—	—	—
Olympia, MHI [44]	MHI	250	Anchor Line	300, 600	P G	X	0.40	—
Olympic	MKC	350	White Star Line	300, 600	P G	N	0.40	—
Omrah [44]	MOK	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Oneka	GTV	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Onward	GUM	50	South Eastern & Chatham Railway	300, 600	P G	N	0.15 [88]	1.50 [88]
Opawa	MRG	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Orama [44]	MTW	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Orari	MRM	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Orbita	MGI	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Orca	MGO	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Oroma [44]	MJF	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	N	0.40	—
Orduna	MGP	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Oriana [44]	MJJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	N	0.40	—
Oriental [44]	GLA	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Orion, BBW	BBW	—	Navy	—	O	—	—	—
Orissa [44]	MJE	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Orita	MJG	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Orlando	BLN	—	Navy	—	O	—	—	—
Oronsa [44]	MJI	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Orontes	MOZ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Oropesa [44]	MJA	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Orotava [44]	GUD	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Orsova [44]	MOF	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Ortega [44]	MJK	250	Pacific Steam Navigation Co.	300, **600**	P G	N	0.40	—
Orteric [44]	GLE	250	Andrew Weir & Co.	300, **600**	P G	N	0.40	—
Oruba [44]	GUE	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Orvieto [44]	MOJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Osiris [44]	GAQ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Oslo [44]	MWO	250	T. Wilson Sons & Co.	300, **600**	P G	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [45]	0.90 [45]
Osterley [44]	MOY	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Otaki	MRP	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Otranto [44]	MOD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
[illegible]	MOH	250	Peninsular & Oriental Steam Nav.	300, **600**	P G	X	0.40	—

	BOZ	—	Navy	—	O	—	[illegible]	—
Pacuare	MLY	150	Elders & Fyffes	300, 600	P G	X	0.40	—
Pakeha "	GLG	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—
Palawan "	GLJ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Palermo	MIL	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Palma	MKD	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Panama, MWB "	MWB	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—
Pancras "	MDI	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Pandora	BGR	—	Navy	—	O	—	—	—
Pannonia "	MNA	250	Cunard Line	300, 600	P G	N	0.40	—
Panther, BLQ	BLQ	—	Navy	—	O	—	—	—
Paparoa "	MHY	250	New Zealand S.S. Co.	300, 600	P G	X	0.40	—
Paragon	BLR	—	Navy	—	O	—	—	—
Paraguayo (El) "	GGY	250	Houlder Line	300, 600	P G	X	0.40	—
Parana, GLK "	GLK	150	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Pardo "	GLL	150	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Parima "	MBK	200	Quebec S.S. Co.	300, 600	P G	N	0.40	—
Paris	GLC	120	L.B. & S.C. Railway Co.	300, 600	P G	N	—	—
Parismina	GHT	250	Tropical Fruit S.S. Co.	300, 400, 600	P G	7 a.m. to 9 p.m.	0.40	—
Parthenia	MNS	250	Donaldson Bros.	300, 600	P G	X	0.40	—
Pathan "	MPV	150	Gellatly, Hankey & Co.	300, 600	P G	X	0.40	—
Pathfinder	BHO	—	Navy	—	O	—	—	—
Patia "	MVW	250	Elders & Fyffes	300, 600	P G	X	0.40	—
Patrician	MIR	250	T. & J. Harrison	300, 600	P G	X	0.40	—
Patrol, BHP	BHP	—	Navy	—	O	—	—	—
Patrol, MEM	MEM	140	Eastern Extension & Australasian & China Tel. Co.	300, 600	P	—	0.40	—
Patuca "	GDB	250	Elders & Fyffes	300, 600	P G	X	0.40	—
Pectan "	MAS	300	Pectan S.S. Co.	300, 600	P	X	0.40	—
Pegasus	BGS	—	Navy	—	O	—	—	—
Pelorus	BGT	—	Navy	—	O	—	—	—
Pera "	MGB	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Peregrine	GST	90	General Steam Nav. Co.	300, 600	P G	X	0.40	—
Perseus	BGU	—	Navy	—	O	—	—	—
Persia	MBS	—	Persia S.S. Co.	300, 600	P G	X	0.40	—
Persia, MMQ "	MMQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Persic "	MQC	250	White Star Line	300, 600	P G	X	0.40	—
Perthshire	GQB	220	Turnbull, Martin & Co.	300, 450, 600	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Peru "	GLN	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—
Perugia "	MAW	250	Anchor Line	300, 600	P G	N	0.40	—
Peshawur	MIQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Petroleum	BQM	—	Navy	—	O	—	—	—
Philadelphian [44]	MNW	250	F. Leyland & Co.	300, **600**	P G ..	N	0.40	—
Philomel	BGV	—	Navy	—	O	—	—	—
Phœnix	BLS	—	Navy	—	O	—	—	—
Picton	BLT	—	Navy	—	O	—	—	—
Pincher	BLU	—	Navy	—	O	—	—	—
Pioneer, BGW	BGW	—	Navy	—	O	—	—	—
Plassy [44]	MNJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	N	0.40	—
Poleric [44]	GCY	250	Andrew Weir & Co.	300, **600**	P G ..	N	0.40	—
Pomeranian [44]	GLO	250	Allan Line	300, **600**	P G ..	N	0.40	—
Ponus	GTT	125	Tank Storage & Carriage Co. ..	300, **600**	P	X	—	—
Porpoise	BLV	—	Navy	—	O	—	—	—
Portia	BLW	—	Navy	—	O	—	—	—
Port Lincoln	GTZ	260	W. Milburn & Co.	300, **600**	P G ..	N	0.40	—
Port Macquarrie	GSB	260	Anglo Australasian Steam Nav. Co.	300, **600**	P G ..	N	0.40	—
Potaro [44]	GLP	150	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Potomac, GLQ [44]	GLQ	150	Anglo-American Oil Co.	300, **600**	P G ..	N	0.40	—
Potosi	MII	250	Pacific Steam Navigation Co. ..	300, **600**	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Powhatan, GTW	GTW	125	Tank Storage & Carriage Co. ..	300, **600**	P	X	—	—
Pretorian [44]	MFN	250	Allan Line	300, **600**	P G ..	N	0.40	—
Prince George, BBX	BBX	—	Navy	—	O	—	—	—
Prince George, GLR [44] ..	GLR	250	Grand Trunk	300, **600**	P G ..	8 a.m. to 12 p.m.	—[55]	—[55]
Prince of Wales	BBY	—	Navy	—	O	—	—	—
Prince Rupert [44]	GLS	250	Grand Trunk	300	P G ..	8 a.m. to 12 p.m.	—[55]	—[55]
Princess Royal, BCU	BCU	—	Navy	—	O	—	—	—
Princess Victoria, MCM [44] ..	MCM	250	Canadian Pacific Railway ..	300, **600**	P G ..	N	0.40 [55]	4.00 [55]
Principello	MBL	250	Uranium S.S. Co.	300, **600**	P G ..	N	0.40	—
Prometheus, BGX	BGX	—	Navy	—	O	—	—	—
Proserpine	BGY	—	Navy	—	O	—	—	—
Protesilaus	GSC	90	A. Holt & Co.	300, 450, **600**	P G ..	X	0.40	4.00
Psyche	BGZ	—	Navy	—	O	—	—	—
Pyramus	BHA	—	Navy	—	O	—	—	—
Queen, BBZ	BBZ	—	Navy	—	O	—	—	—
Queen, [illegible]	[illegible]	[illegible]	South Eastern & Chatham Railway	300, **600**	P G ..	N	0.15 [55]	1.50 [55]

Raccoon	BLY	—	Navy	—	O	—	—	—
Raeburn 44	MES	250	Lamport & Holt	300, 600	P G	X	0.40	—
Rakia	MRO	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Ramos	GLU	140	Amazon Telegraph Co.	300, 600	P	—	—	—
Rangatira 44	GLW	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—
Ranger	MLD	150	Liverpool Salvage Association	300, 600	P	X	0.40	—
Raphael 44	MET	250	Lamport & Holt	300, 600	P G	X	0.40	—
Rappahannock 44	MNO	250	Furness, Withy & Co.	300, 600	P G	X	0.40	—
Rattlesnake	BLZ	—	Navy	—	O	—	—	—
Recorder	MEJ	140	Eastern Extension, Australasian & China Telegraph Co.	300, 600	P	—	0.40	—
Redgauntlet	BMA	—	Navy	—	O	—	—	—
Redpole	BMB	—	Navy	—	O	—	—	—
Rembrandt, MEU 44	MEU	250	Lamport & Holt	300, 600	P G	X	0.40	—
Remuera 44	MKV	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Renard	BMC	—	Navy	—	O	—	—	—
Restitution	GSE	130	Southern Whaling & Sealing Fo.	300, 600	P	X	—	—
Restorer	GMA	350	Commercial Pacific Cable Co.	300, 600	P	—	0.40	—
Revenge	BCA	—	Navy	—	O	—	—	—
Reventazon	MMI	150	Elders & Fyffes	300, 600	P G	X	0.40	—
Rewa 44	MQB	250	British India Steam Nav. Co.	300, 600	P G	N	0.40	—
Ribble	BMD	—	Navy	—	O	—	—	—
Rifleman	BME	—	Navy	—	O	—	—	—
Rimutaka 44	MBT	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Riviera	GUO	50	South Eastern & Chatham Railway	300, 600	P G	N	0.15	1.50
Rob Roy	BMF	—	Navy	—	O	—	—	—
Rocket	BMG	—	Navy	—	O	—	—	—
Roebuck	MRU	120	Great Western Rly.	300, 600	P G	N	—	—
Rohilla 44	MQA	250	British India Steam Nav. Co.	300, 600	P G	N	0.40	—
Romney 44	MEV	250	Lamport & Holt	300, 600	P G	X	0.40	—
Rosalind	BMH	—	Navy	—	O	—	—	—
Rosarina (La) 44	GJW	250	British & Argentine Steam Nav. Co.	300, 600	P G	X	0.40	—
Rosario, BQV	BQV	—	Navy	—	O	—	—	—
Roscommon	GZZ	220	New Zealand Shipping Co.	300, 450, 600	P G	X	0.40	—
Roseric 44	GLY	250	Andrew Weir & Co.	300, 600	P G	N	0.40	—
Rossetti 44	MEY	250	Lamport & Holt	300, 600	P G	X	0.40	—
Rother	BMI	—	Navy	—	O	—	—	—
Rotorua 44	MKE	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Rowanmore 44	GAS	250	W. Johnstone & Co.	300, 600	P G	N	0.40	—
Roxburgh	BEA	—	Navy	—	O	—	—	—
Royal Arthur	BER	—	Navy	—	O	—	—	—
Royal Oak	BCB	—	Navy	—	O	—	—	—
Royston Grange 44	GLZ	250	Houlder Line	300, 600	P G	X	0.40	—
Ruahine 44	MKA	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Ruapehu 44	MKB	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Ruby	BMJ	—	Navy	—	O	—	—	—
Runic 44	MWC	250	White Star Line	300, 600	P G	X	0.40	—
Russell	BCC	—	Navy	—	O	—	—	—
Ruthenia 44	MLN	150	Canadian Pacific Railway	300, 600	P G	N	0.40	—
Sachem 44	MOL	250	White Diamond S.S. Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Sagamore [44]	MPT	250	White Diamond S.S. Co.	300, **600**	P G	X	0.40	—
S. Tudno	GNR	80	MacIver S.S. Co.	300, **600**	P R	X	0.10	1.00
St. Andrew	GYJ	120	Fishguard & Rosslare Railways & Harbours Co.	300, **600**	P G	N	0.05	0.50
St. David	GYL	120	Fishguard & Rosslare Railways & Harbours Co.	300, **600**	P G	N	0.05	0.50
St. George, GIB [44]	GIB	150	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
St. George, BOU	BOU	—	Navy	—	O	—	—	—
Santa Marta	GHU	250	Tropical Fruit S.S. Co.	300, 400, **600**	P G	7 a.m. to 9 p.m.	0.40	—
St. Patrick	GYM	120	Fishguard & Rosslare Railways & Harbours Co.	300, **600**	P G	N	0.05	0.50
St. Petersburg	GPK	130	Great Eastern Railway	300, 450, **600**	P R[180]	N	0.10	1.00
St. Vincent	BCD	—	Navy	—	O	—	—	—
Salamis [44]	GNA	250	Andrew Weir & Co.	300, **600**	P G	N	0.40	—
Saldanha [44]	GEG	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Salmo [44]	GYI	250	T. Wilson Sons & Co.	300, **600**	P G	8.30 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15	—
Salsette [44]	MMT	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Samoset	GTH	125	Tank Storage & Carriage Co., Ltd.	300, **600**	P	X	—	—
Sandfly	BMK	—	Navy	—	O	—	—	—
Sandon Hall [44]	MRY	150	Ellerman Line	300, **600**	P G	N	0.40	—
San Dunstano [44]	MAN	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Eduardo	MJV	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Francisco	MIB	200	Isthmian S.S. Co.	300, **600**	P G	X	0.40	—
San Fraterno	GYN	250	Eagle Oil Transport Co.	300, **600**	P G	N	0.40	—
San Gregorio [44]	MAC	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Hilario	MIZ	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Isidoro	MJO	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Jeronimo	MJP	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Lorenzo	MND	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Ricardo	MBR	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
Santa Rosalia [44]	GAG	300	Isthmian S.S. Co.	300, **600**	P G	X	0.40	—
San Tirso [44]	MAO	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Urbano	MCC	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—

		—	Navy	—	O ..	—	—	—
Sardinia, GMB "	GMB	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Sardinian "	MDN	250	Allan Line	300, 600	P G	N	0.40	—
Sarnia, MKY "	MKY	250	London & South Western Railway	300, 600	P G	N	0.15	1.50
Sarpedon	BMM	—	Navy	—	O ..	—	—	—
Satanta	GTG	125	Tank Storage & Carriage Co.	300, 600	P ..	X	—	—
Saturnia "	MBF	250	Donaldson Bros.	300, 600	P G	N	0.40	—
Savage	BMN	—	Navy	—	O ..	—	—	—
Saxon "	MQI	250	Union Castle	300, 600	P G	N	0.40	—
Saxonia "	MSA	250	Cunard Line	300, 600	P G	N	0.40	—
Scandinavian "	MNC	250	Allan Line	300, 600	P G	N	0.40	—
Scindia "	MHJ	250	Anchor Line	300, 600	P G	X	0.40	—
Scorpion, BMO	BMO	—	Navy	—	O ..	—	—	—
Scotia, GRR	GRR	170	Lamport & Holt	300, 600	P G	N	0.05	0.50
Scotia, MRK " "	MRK	250	R. Kinnes	300, 600	P G	N	0.40	—
Scotian "	MJN	250	Allan Line	300, 600	P G	N	0.40	—
Scourge	BMP	—	Navy	—	O ..	—	—	—
Scylla	BGF	—	Navy	—	O ..	—	—	—
Sentinel, BHQ	BHQ	—	Navy	—	O ..	—	—	—
Sentinel, MFB	MFB	140	Eastern Telegraph Co.	300, 600	P ..	—	0.40	—
Sequoya	GQE	130	Tank Storage & Carriage Co., Ltd.	300, 600	P ..	X	—	—
Shabonee	GSS	140	Tank Storage & Carriage Co., Ltd.	300, 600	P G	X	—	—
Shannon	HEB	—	Navy	—	O ..	—	—	—
Shark	BMQ	—	Navy	—	O ..	—	—	—
Sharpshooter	BPA	—	Navy	—	O ..	—	—	—
Sheldrake	BMR	—	Navy	—	O ..	—	—	—
Shenandoah "	MNP	250	Furness Withy & Co.	300, 600	P G	X	0.40	—
Sherard Osborn	MFK	140	Eastern Telegraph Co.	300, 600	P ..	—	0.40	—
Shropshire	GSF	330	Federal Steam Nav. Co.	300, 450, 600	P G	N	0.40	—
Sicilia, GMC	GMC	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Sicilian "	MUN	250	Allan Line	300, 600	P G	N	0.40	—
Silvertown "	GMD	140	India Rubber, Etc., Works	300, 600	P ..	—	—	—
Simla "	GME	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Sirius	BGG	—	Navy	—	O ..	—	—	—
Sir Richard Awdry	GQG	90	Pekin Syndicate	300, 600	P G	X	—	—
Sixaola	GHV	250	Tropical Fruit S.S. Co.	300, 500, 600	P G	8 a.m. to 8 p.m.	0.40	—
Skipjack	BPX	—	Navy	—	O ..	—	—	—
Skirmisher	BHR	—	Navy	—	O ..	—	—	—
Snaefell "	MCS	100	Isle of Man Steam Packet Co.	300, 600	P G	N	0.05	0.50
Somali "	MIW	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Somerset, GQD	GQD	225	Federal Steam Nav. Co.	300, 600	P G	—	0.40	—
Sorata	MIJ	250	Pacific Steam Navigation Co.	300, 600	P G	9 a.m. to 11 a.m., 8.m. to 2 a.m.	0.40	—
Soudan "	MNB	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Southampton	BGH	—	Navy	—	O ..	—	—	—
South Point "	GHZ	250	Norfolk & North American S.S. Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd*							Francs.	Francs
Spanker..	BPY	—	Navy	—	O	—	—	—
Sparrowhawk	BMS	—	Navy	—	O	—	—	—
Spartiate	BES	—	Navy	—	O	—	—	—
Sphinx	BPI	—	Navy	—	O	—	—	—
Spitfire	BMT	—	Navy	—	O	—	—	—
Star of Australia [44]	MAH	250	Star Line, Ltd.	300, **600**	P G	X	0.40	—
Star of England [44]	MAK	250	Star Line, Ltd.	300, **600**	P G	X	0.40	—
Star of India [44]	GYZ	250	Star Line, Ltd.	300, **600**	P G	X	0.40	—
Star of Ireland [44]	GMF	250	Star Line, Ltd.	300, **600**	P G	X	0.40	—
Star of Scotland [44]	MTS	250	Star Line, Ltd.	300, **600**	P G	X	0.40	—
Star of Victoria [44]	MAL	250	Star Line, Ltd.	300, **600**	P G	X	0.40	—
Start Point [44]	GIA	250	Norfolk & North American S.S. Co.	300, **600**	P G	X	0.40	—
Statesman [44]	MHP	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Staunch..	BMU	—	Navy	—	O	—	—	—
Stephano [44]	MDY	250	Bowring Line	300, **600**	P G	N	0.40	—
Stephen [44]	MDJ	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Stour	BMV	—	Navy	—	O	—	—	—
Submarine B5	BOK	—	Navy	—	O	—	—	—
Suevic [44]	MJC	250	White Star Line	300, **600**	P G	X	0.40	—
Suffolk ..	BEC	—	Navy	—	O	—	—	—
Sumatra, GMJ [44]	GMJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Sunda [44]	GML	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Superb ..	BCE	—	Navy	—	O	—	—	—
Surat	GEL	250	A. Weir & Co.	300, **600**	P G	X	0.40	—
Surprise, BQJ	BQJ	—	Navy	—	O	—	—	—
Sussex ..	MVC	85	L.B. & S.C. Rly. Co.	300, **600**	P G	N	—	—
Sutherland Grange [44]	GMM	250	Houlder Line	300, **600**	P G	X	0.40	—
Sutlej	BED	—	Navy	—	O	—	—	—
Suveric [44]	GMO	250	Andrew Weir & Co.	300, **600**	P G	N	0.40	—
Swanmore	MAE	250	W. Johnstone & Co.	300, **600**	P G	X	0.40	—
Swale	BMW	—	Navy	—	O	—	—	—
Swazi [44]	MAV	150	Bucknall S.S. Lines	300, **600**	P G	X	0.40	—
Swift	BMX	—	Navy	—	O	—	—	—
Swiftsure	[illegible]	—	Navy	—	O	—	—	—

[illegible]	[illegible]	250	Shaw, Savill & Albion	[illegible]	P G	X	0.40	—
[illegible]	MOR	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Talbot	BGI	—	Navy	—	O	—	—	—
Talisman	BMZ	..	Navy	—	O	—	—	—
Talthybius	GSH	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Tamaha	GSG	140	Tank Storage & Carriage Co., Ltd.	300, 600	P G	X	—	—
Tara [44]	GMQ	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Taroba [44]	GMR	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Tarquah [44]	MZT	250	Elder Dempster	300, 600	P G	N	0.40	—
Tartar	BNA	—	Navy	—	O	—	—	—
Tascalusa	GSD	140	Tank Storage & Carriage Co., Ltd.	300, 600	P G	X	—	—
Tatarrax	GSK	140	Tank Storage & Carriage Co., Ltd.	300, 600	P G	X	—	—
Teesta [44]	GMT	250	British India Steam Nav. Co., Ltd.	300, 600	P G	X	0.40	—
Telconia	MCJ	140	Telegraph Construction & Maintenance Co.	300, 600	P	X	—	—
Temeraire	BCG	—	Navy	—	O	—	—	—
Tennyson [44]	GDG	250	Lamport & Holt	300, 600	P G	N	0.40	—
Terrible	BET	—	Navy	—	O	—	—	—
Test	BNB	—	Navy	—	O	—	—	—
Teucer	GSJ	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Teutonic [44]	MTC	250	White Star Line	300, 600	P G	N	0.40	—
Teviot	BNC	—	Navy	—	O	—	—	—
Thames, BPJ	BPJ	..	Navy	—	O	—	—	—
Thames, GUG [44]	GUG	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Themistocles, MGM [44]	MGM	250	Aberdeen Line	300, 600	P G	N	0.40	—
Theseus	BEU	—	Navy	—	O	—	—	—
Thetis, BPK	BPK	—	Navy	—	O	—	—	—
Thistle	BPZ	—	Navy	—	O	—	—	—
Thongwa [44]	GMU	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Thunderer	BCH	—	Navy	—	O	—	—	—
Tiger, BCW	BCW	—	Navy	—	O	—	—	—
Tigress	BND	—	Navy	—	O	—	—	—
Titan	GSO	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Tivives	GHW	250	Tropical Fruit S.S. Co.	300, 500, 600	P G	8 a.m. to 8 p.m.	0.40	—
Tokomaru	MNF	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—
Tonawanda [44]	GMV	150	Anglo-American Oil Co.	300, 600	P G	N	0.40	—
Tongariro [44]	GBD	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Topaze	BHC	—	Navy	—	O	—	—	—
Torch	BQF	—	Navy	—	O	—	—	—
Toronto [44]	GBS	250	T. Wilson, Sons & Co.	300, 600	P G	8 a.m. to 1 p.m., 2 p.m. to 5 p.m. 6 p.m. to 10 p.m.	0.40	—
Torpedo Boat No. 2	BNU	—	Navy	—	O	—	—	—
Torpedo Boat No. 4	BNV	—	Navy	—	O	—	—	—
Torpedo Boat No. 5	BNW	—	Navy	—	O	—	—	—
Torpedo Boat No. 14	BNX	—	Navy	—	O	—	—	—
Torpedo Boat No. 15	BNY	—	Navy	—	O	—	—	—
Torpedo Boat No. 25	BNZ	—	Navy	—	O	—	—	—
Torpedo Boat No. 28	BOA	—	Navy	—	O	—	—	—
Torpedo Boat, No. 29	BOB	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Torpedo Boat, No. 30 ..	BOC	—	Navy	—	O	—	—	—
Torpedo Boat, No. 31 ..	BOD	—	Navy	—	O	—	—	—
Torpedo Boat, No. 32 ..	BOE	—	Navy	—	O	—	—	—
Torpedo Boat, No. 33 ..	BOF	—	Navy	—	O	—	—	—
Torpedo Boat, No. 34 ..	BOG	—	Navy	—	O	—	—	—
Torpedo Boat, No. 35.. ..	BOH	—	Navy	—	O	—	—	—
Torpedo Boat, No. 36.. ..	BOI	—	Navy	—	O	—	—	—
Tortuguero	MMO	150	Elders & Fyffes	300, **600**	P G ..	X	0.40	—
El Toro	MHD	250	Lobitos Oilfields, Ltd.	300, **600**	P G ..	X	0.40	—
Trefoil	BQP	—	Navy	—	O	—	—	—
Trent [44]	GUH	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Trinidad	GBH	—	Quebec S.S. Co.	300, **600**	P G ..	N	0.40	—
Trinidadian	GLH	—	Trinidadian Ltd.	300, **600**	P G ..	N	0.40	—
Tritonia [44]	MBJ	250	Donaldson Bros.	300, **600**	P G ..	X	0.40	—
Triumph	BCI	—	Navy	—	O	—	—	—
Tropic [44]	GDU	250	White Star Line	300, **600**	P G ..	X	0.40	—
Tunisian [44]	MTN	250	Allan Line	300, **600**	P G ..	N	0.40	—
Turakina [44]	MKJ	250	New Zealand Shipping Co. ..	300, **600**	P G ..	X	0.40	—
Turcoman [44]	GEA	250	Dominion Line	300, **600**	P G ..	X	0.40	—
Turrialba	GHN	250	Tropical Fruit S.S. Co.	300, **600**	P.G ..	N	0.40	—
Tyne	BQW	—	Navy	—	O	—	—	—
Tyrolia [44]	MLE	150	Canadian Pacific Railway ..	300, **600**	P G ..	N	0.40	—
Ulster [44]	MCW	140	City of Dublin Steam Packet Co.	300, **600**	P G ..	—	0.05	0.50
Ultonia [44]	MTA	250	Cunard Line	300, **600**	P G ..	N	0.40	—
Ulysses, BNE	BNE	—	Navy	—	O	—	—	—
Ulysses, GBU [44]	GBU	250	A. Holt & Co.	300, **600**	P G ..	X	0.40	—
Uncas	GSA	140	Tank Storage & Carriage Co. ..	300, **600**	P G ..	X	—	—
Unity	BNF	—	Navy	—	O	—	—	—
Uranium	MWU	250	Uranium S.S. Co.	300, **600**	P G ..	N	0.40	—
Ure	BNG	—	Navy	—	O	—	—	—
Uruguayo (El) [44]	GGZ	250	British & Argentine Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Usk	BNH	—	Navy	—	O	—	—	—
Vallant (S.Y.) [44]	GES	150	Lord Pirrie	300, **600**	P G ..	X	0.40	—
Vandyck [44]	[illegible]	250	Lamport & Holt	300, **600**	P G ..	N	0.40	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—

	GND	250	Lamport & Holt	300, 600	P G	N	0.40	—
Vernon	BOR	—	Navy	—	O	—	—	—
Vestris [44]	MJZ	250	Lamport & Holt	300, 600	P G	N	0.40	—
Victor	BNJ	—	Navy	—	O	—	—	—
Victoria, GUP	GUP	50	South Eastern & Chatham Railway	150, 300, 600	P G	N	0.15 [10]	1.50 [10]
Victoria, MWD [44]	MWD	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—
Victoria and Albert	BQH	—	Navy	—	O	—	—	—
Victorian, MVN [44]	MVN	250	Allan Line	300, 600	P G	N	0.40	—
Victorian, MYY [44]	MYY	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Victorious	BCM	—	Navy	—	O	—	—	—
Vienna	GPL	130	Great Eastern Railway	300, 450, 600 [45]	P R [47]	N	0.10	1.00
Vigilant	BNK	—	Navy	—	O	—	—	—
Viking, BNL	BNL	—	Navy	—	O	—	—	—
Viking, MCD	MCD	140	Amazon Telegraph Co.	300, 600	P	X	—	—
Viking, MVK (The) [44]	MVK	350	Viking Cruising Co.	300, 600	P G	N	0.40 [40]	— [40]
Viking, MVQ [44]	MVQ	66	Isle of Man Steam Packet Co.	300	P R [48]	N	0.05	0.50
Vindictive	BGK	—	Navy	—	O	—	—	—
Viola	BNM	..	Navy	—	O	—	—	—
Violet	BNN	—	Navy	—	O	—	—	—
Virginian [44]	BGN	250	Allan Line	300, 600	P G	N	0.40	—
Vitruvia [44]	GYS	150	Gow, Harrison & Co.	300, 600	P G	X	0.40	—
Voltaire, GND [44]	GND	250	Lamport & Holt	300, 600	P G	N	0.40	—
Vulcan, BPB	BPB	—	Navy	—	O	—	—	—
Wabasha	GTN	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Waimana [44]	GNE	250	Shaw Savill & Albion	300, 600	P G	X	0.40	—
Waimate	MOS	150	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Waipara [44]	GNK	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Waiwera	MRV	250	Shaw, Savill & Albion Co.	300, 600	P G	X	0.40	—
Walmer Castle [44]	MQH	250	Union Castle	300, 600	P G	N	0.40	—
Walton Hall [44]	MTH	150	Ellerman Lines	300, 600	P G	N	0.40	—
Waneta [44]	GAE	250	Tank Storage & Carriage Co.	300, 600	P G	N	0.40	—
Wapello	GQL	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Warrior	BEE	—	Navy	—	O	—	—	—
Warwickshire [44]	MYO	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—
Watchful	BPM	—	Navy	—	O	—	—	—
Waveney	BNO	—	Navy	—	O	—	—	—
Waverley	BNP	—	Navy	—	O	—	—	—
Wayfarer [44]	GCI	250	T. & J. Harrison	300, 600	P G	X	0.40	—
Wear	BNQ	—	Navy	—	O	—	—	—
Welland	BNR	—	Navy	—	O	—	—	—
Welshman [44]	GEB	250	Dominion Line	300, 600	P G	X	0.40	—
Westmeath	MJQ	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
West Point [44]	GIK	250	Norfolk & N. American S.S. Co.	300, 600	P G	X	0.40	—
Weymouth	BGL	—	Navy	—	O	—	—	—
Whakarua [44]	GRZ	250	Tyser Line	300, 600	P G	X	0.40	—
Whakatane	MRI	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Whaler, COJ	GSP	45	Southern Whaling & Sealing Co.	300	P	X	—	—
Whaler, GDI	GSQ	45	Southern Whaling & Sealing Co.	300	P	X	—	—
Whaler, TWI	GSR	45	Southern Whaling & Sealing Co.	300	P	X	—	—
Wiltshire [44]	GSU	330	General Steam Nav. Co.	300 600	P G	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Wilcannia	GNH	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Winamac	GSM	140	Tank Storage & Carriage Co.	300, **600**	P G	X	—	—
Winifredian [44]	MFL	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Wolverine	BNS	—	Navy	—	O	—	—	—
Woolwich	BOV	—	Navy	—	O	—	—	—
Worcestershire [44]	MYM	250	Bibby Bros. & Co.	300, **600**	P G	X	0.40	—
Yarmouth	BGM	—	Navy	—	O	—	—	—
Zacapa	GHY	250	Tropical Fruit S.S. Co.	300, 400, **600**	P G	7 a.m. to 9 p.m.	0.40	—
Zealandia	BCN	—	Navy	—	O	—	—	—
Zealandic [44]	MUZ	250	White Star Line	300, **600**	P G	X	0.40	—
Zent	MMP	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Zorro, El	MHE	250	Lobitos Oilfields, Ltd.	300, **600**	P G	X	0.40	—
Zulu	BNT	—	Navy	—	O	—	—	—
GREECE								
Aetos	SYO	—	Navy	—	O	—	—	—
Aigli	SYV	—	Navy	—	O	—	—	—
Alcyon	SYU	—	Navy	—	O	—	—	—
Amfitrite	SYM	—	Navy	—	O	—	—	—
Amphitrite (S.Y.)	—	—	—	—	—	—	—	—
Arethousa	SYW	—	Navy	—	O	—	—	—
Aspis	SYI	—	Navy	—	O	—	—	—
Athinai [11]	SVA	220	Hellenic Transatlantic Steam Nav. Co.	300, 450, **600**	P G	N	0.40	4.00
Averoff	SYA	—	Navy	—	O	—	—	—
Daphni	SYX	—	Navy	—	O	—	—	—
Doris, SYY	SYY	—	Navy	—	O	—	—	—
Doxa	SYD	—	Navy	—	O	—	—	—
Hydra, SYH	SYH	—	Navy	—	O	—	—	—
Ieraz	SYE	—	Navy	—	O	—	—	—
Ioannina [11]	SVI	200	National Steam Nav. Co. of Greece	300, 450, **600**	P G	N	0.40	4.00
Kanaris	[illegible]	—	Navy	—	O	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	—	O	—	—	—

Psara	SV[illegible]	140	National Steam Nav. Co. of Greece	300, 450, 600	P G	N	0.40	4.00
Sfendoni	SYQ	—	Navy	—	O	—	—	—
Spetsai	SYF	—	Navy	—	O	—	—	—
Themistocles, SVT [11]	SYS	—	Navy	—	O	—	—	—
	SVT	220	Hellenic Transatlantic Steam Nav. Co.	300, 450, 600	P G	N	0.40	4.00
Thesaloniki [11]	SVK	200	National Steam Nav. Co. of Greece	300, 450, 600	P G	N	0.40	4.00
Thétis, SYZ	SYZ	—	Navy	—	O	—	—	—
Thyella	SYT	—	Navy	—	O	—	—	—
Velos	SYB	—	Navy	—	O	—	—	—
GUIANA (DUTCH)								
Commewijne	PJO	—	Koninklijke West Indische Maield.	300, 600	P G	—	0.40	4.00
Nickerie	PJN	—	Koninklijke West Indische Maield.	300, 600	P G	—	0.40	4.00
HOLLAND								
Arakan	PHD	100–150	Rotterdamsche Lloyd Line	300, 600	P G	N	0.40	4.00
Atlas, PIB [11]	PIB	75–100	Amsterdam Tug and Salvage Co.	300, 450, 600	P G	X	0.40	4.00
Bandoeng [11]	PGD	100–150	Rotterdamsche Lloyd Line	300, 600	P G	X	0.40	4.00
Banka	PHI	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Batavier II.	PDG	200	Wm. H. Müller & Co.	800, 450, 600	P R [60]	N	0.05 [63]	0.50 [63]
Batavier III.	PDH	200	Wm. H. Müller & Co.	800, 450, 600	P R [60]	N	0.05 [63]	0.50 [63]
Batavier IV.	PDI	200	Wm. H. Müller & Co.	800, 450, 600	P R [60]	N	0.05 [63]	0.50 [63]
Batavier V.	PDJ	200	Wm. H. Müller & Co.	800, 450, 600	P R [60]	N	0.05 [63]	0.50 [63]
Batjan [11]	PGV	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Bawean	PHJ	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Billiton [11]	PGT	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Bœton [11]	PGU	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Brinio	PAV	60	Navy	300, 600	O [61]	—	—	—
Boeroe	PHK	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Bulhond	PBZ	150	Navy	300, 600	O [61]	—	—	—
Celebes	PGO	100–150	Nederland Line	300, 600	P G	X	0.40	4.00
Deli [11]	PGG	100–150	Rotterdamsche Lloyd Line	300, 600	P G	X	0.40	4.00
De Ruyter	PAC	200	Navy	300, 600	O [61]	—	—	—
De Zeven Provinciën	PAA	400	Navy	300, 600	O [61]	—	—	—
Djember	PHF	100–150	Rotterdamsche Lloyd Line	300, 600	P G	—	0.40	4.00
Evertsen	PAN	100	Navy	300, 600	O [61]	—	—	—
Fret	PBY	150	Navy	300, 600	O [61]	—	—	—
Frisia [11]	PEF	200–250	Koninklijke Hollandsche Lloyd Line	300, 600	P G	N	0.40	4.00
Friso	PAW	60	Navy	300, 600	O [61]	—	—	—
Gelderland	PAK	100	Navy	300, 600	O [61]	—	—	—
Goentoer [11]	PFA	200	Rotterdamsche Lloyd Line	300, 600	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m to 10 p.m.	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
HOLLAND—*contd.*							Francs.	Francs.
Gelria [11]	PEG	200–250	Koninklijke Hollandsche Lloyd Line	300, 450, **600**	P G ..	N	0.40	4.00
Gorontalo [11]	PGC	100–150	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	X	0.40	4.00
Grotius [11]	PFI	200	Nederland Line	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Gruno	PAU	60	Navy	300, **600**	O [61] ..	—	—	—
Hermelijn	PBT	150	Navy	300, **600**	O [61] ..	—	—	—
Hertog Hendrik	PAD	200	Navy	300, **600**	O [61] ..	—	—	—
Holland..	PAH	200	Navy	300, **600**	O [61] ..	—	—	—
Hollandia [11]	PEH	200–250	Koninklijke Hollandsche Lloyd Line	300, **600**	P G ..	N	0.40	4.00
Hydra, PAQ	PAQ	60	Navy	300, **600**	O [61] ..	—	—	—
Insulande	PFS	200	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	—	0.40	4.00
Jacatra	PHE	100–150	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	—	0.40	4.00
Jacob van Heemskerk ..	PAL	100	Navy	300, **600**	O [61] ..	—	—	—
Jakhals	PBU	150	Navy	300, **600**	O [61] ..	—	—	—
Kambangan [11]	PGS	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Kangean [11]	PGP	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Karimata [11]	PGQ	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Karimoen [11]	PGW	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Kawi [11]	PFD	200	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m to 10 p.m.	0.40	4.00
Koningin der Nederlanden [11] ..	PFO	200	Nederland Line	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Koningin Emma	PFQ	200	Nederland Line	300, **600**	P G ..	—	0.40	4.00
Koningin Regentes, PAE ..	PAE	400	Navy	300, **600**	O [61] ..	—	—	—
Koningin Regentes, PDB [60] ..	PDB	150	Zeeland Co., Flushing	300, 500,[60] **600**	P R [60] ..	N	— [60]	— [60]
Koningin Wilhelmina [60] ..	PDA	150	Government	300, 500,[60] **600**	P R [60] ..	N	— [60]	— [60]
Koning Willem III.[11]	PFJ	200	Nederland Line	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8	0.40	4.00

Mecklenburg, PDD [57]	PDD	150	Zeeland Co., Flushing ..	300, 500,[60] 600	P R [60] ..	N	—[62]	—[62]
Medan [11]	PGA	100–150	Rotterdamsche Lloyd Line	300, 600	P G ..	X	0.40	4.00
Medusa, PAR	PAR	60	Navy	300, 600	O [61] ..	—	—	—
Menado [11]	PGB	100–150	Rotterdamsche Lloyd Line	300, 600	P G ..	X	0.40	4.00
Merauke [11]	PGE	100–150	Rotterdamsche Lloyd Line	300, 600	P G ..	X	0.40	4.00
Nias [11]	PGR	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Nieuw Amsterdam [11]	PEB	200–250	Holland Amerika Line ..	300, 600	P G ..	N	0.40	4.00
Noordam [11]	PEC	200–250	Holland-Amerika Line ..	300, 600	P G ..	N	0.40	4.00
Noordbrabant	PAJ	200	Navy	300, 600	O [61] ..	—	—	—
Noorderdijk [11]	PGY	200	Holland Amerika Line	300, 450, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Noordwijk	PHG	—	Erhardt & Dekkers	300, 600	P G ..	—	0.40	4.00
Oosterdijk [11]	PGX	200	Holland Amerika Line	300, 450, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Onderzeeboot	PBO [11]	20	Navy	300	O [61] ..	—	—	—
Ophir, PFB [11]	PFB	200	Rotterdamsche Lloyd Line ..	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Oranje [11]	PFP	200	Nederland Line	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Oranje Nassau, PDE [57] ..	PDE	150	Zeeland Co., Flushing	300, 500,[60] 600	P R [60] ..	N	—[62]	—[62]
Oranje Nassau, PEM [11] ..	PEM	150–200	Koninklijke West Indische Mail-dienst	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Palembang [11]	PGK	100–150	Rotterdamsche Lloyd Line ..	300 600	P G ..	X	0.40	4.00
Panter	PBS	150	Navy	300, 600	O [61] ..	—	—	—
Piet Hein	PAO	100	Navy	300, 600	O [61] ..	—	—	—
Potsdam [11]	PEE	200–250	Holland Amerika Line	300, 600	P G ..	N	0.40	4.00
Prins der Nederlanden [11] ..	PFR	150–200	Koninklijke West Indische Mail-dienst	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Prinsder Nederlanden	PFQ	200	Nederland Line	300, 600	P G ..	—	0.40	4.00
Prinses Juliana, PDF [57] ..	PDF	150	Zeeland Co., Flushing	300, 500,[60] 600	P R [60] ..	N	—[62]	—[62]
Prinses Juliana, PFN [11] ..	PFN	200	Nederland Line	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m to 12 a.m., 2 p.m.. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Prins Frederik Hendrik [11] ..	PEK	150–200	Koninklijke West Indische Mail-dienst	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Prins Hendrik [60]	PDC	150	Zeeland Co., Flushing	300, 500,[60] 600	P R [60] ..	N	—[62]	—[62]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
HOLLAND—*contd.*							Francs.	Francs.
Prins Maurits [11]	PEL	150–200	Koninklijke West Indische Maildienst	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Radja	PHA	100–150	Nederland Line	300, **600**	P G	X	0.40	4.00
Rembrandt, PFK [11]	PFK	200	Nederland Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Rindjani [11]	PFH	200	Rotterdamsche Lloyd Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Riouw	PHB	100–150	Nederland Line	300, **600**	P G	X	0.40	4.00
Roode Zee [11]	PIA	100	L. Smit & Co.	300, **600**	P G	X	0.40	4.00
Roepat	PHL	100–150	Nederland Line	300, **600**	P G	X	0.40	4.00
Rondo	PHM	100–150	Nederland Line	300, **600**	P G	X	0.40	4.00
Rotti	PHC	100–150	Nederland Line	300, **600**	P G	X	0.40	4.00
Rotterdam	PIE	100–150	American Petroleum Co.	300, **600**	P G	X	0.40	4.00
Rotterdam [11]	PEA	200–250	Holland Amerika Line	300, **600**	P G	N	0.40	4.00
Ryndam [11]	PED	200–250	Holland Amerika Line	300, **600**	P G	N	0.40	4.00
Samarinda [11]	PGH	100–150	Rotterdamsche Lloyd Line	300, **600**	P G	X	0.40	4.00
Sindoro [11]	PFE	200	Rotterdamsche Lloyd Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Soerakarta [11]	PGJ	100–150	Rotterdamsche Lloyd Line	300, **600**	P G	X	0.40	4.00
Statendam	PES	200	Holland Amerika Line	300, **600**	P G	N	0.40	4.00
Sumatra, PGM [11]	PGM	100–150	Nederland Line	300, **600**	P G	X	0.40	4.00
Tabanan [11]	PFF	200	Rotterdamsche Lloyd Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Tambora [11]	PFC	200	Rotterdamsche Lloyd Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00

						... p.m. to 6 p.m., 8 p.m. to 10 p.m.		
Vos	PBV	150	Navy	300, 600	O [61] ..	—	—	—
Westerdijk [11]	PGZ	200	Holland Amerika Line	300, 450, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Wilis[11]	PFG	200	Rotterdamsche Lloyd Line ..	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Witte Zee	PIC	100	L. Smit & Co.	300, 600	P.G ..	X	0.40	4.00
Wolf	PBW	150	Navy	300, 600	O [61] ..	—	—	—
Zeehond	PAZ	100	Navy	300, 600	O [61] ..	—	—	—
Zeeland, PAF	PAF	200	Navy	300, 600	O [61] ..	—	—	—
Zeelandia [11]	PEI	200–250	Koninklijke Hollandsche Lloyd Line	300, 600	P G ..	N	0.40	4.00
Zwarte Zee	PID	100	L. Smit & Co.	300, 600	P G ..	X	0.40	4.00
HONDURAS (BRITISH)								
Coppename	VRA	—	Tropical Fruit S.S. Co.	300, 600	P G ..	—	—	—
Marowigne	VRB	—	Tropical Fruit S.S. Co.	300, 600	P G ..	—	—	—
Saramacca	VRC	—	Tropical Fruit S.S. Co.	300, 600	P G ..	—	—	—
Suriname	VRD	—	Tropical Fruit S.S. Co.	300, 600	P G ..	—	—	—
HONG KONG								
Nile, VRE [66]	VRE	300	Nile Steamship Co., Ltd. ..	300, 600	P G ..	N	0.40	4.00
ITALY								
Agordat	IKR	—	Navy	—	—	—	—	—
Alpino	IBE	—	Navy	—	—	—	—	—
Amalfi	IHS	—	Navy	—	—	—	—	—
America [66]	IZA	270	Navigazione Générale Italiana ..	300, 600	P G ..	N	0.40	—
Amerigo Vespucci	IVG	—	Navy	—	—	—	—	—
Ammiraglio Magnaghi ..	IVY	—	Navy	—	—	—	—	—
Ammiraglio Saint Bon ..	IHV	—	Navy	—	—	—	—	—
Ancona [66]	ITA	270	Italia Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Andrea Doria	IHA	—	Navy	—	—	—	—	—
Animoso	IBD	—	Navy	—	—	—	—	—
Aquilone	IBF	—	Navy	—	—	—	—	—
Archimede	IVU	—	Navy	—	—	—	—	—
Ardente..	IBB	—	Navy	—	—	—	—	—
Ardito	IBA	—	Navy	—	—	—	—	—
Artigliere	IBG	—	Navy	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
							Francs.	Francs.
ITALY—*contd.*								
Audace	IBC	—	Navy	—	—	—	—	—
Basilicata	IKL	—	Navy	—	—	—	—	—
Bayonne **	ILB	190	Soc. Italo-Americana pel Petrolio	300, **600**	P	X	0.40	—
Benedetto Brin	IHI	—	Navy	—	—	—	—	—
Bengasi	IVI	—	Navy	—	—	—	—	—
Bersagliere	IBH	—	Navy	—	—	—	—	—
Bologna **	ITB	190	La Veloce Steam Nav. Co. ..	300, **600**	P G ..	N	0.40	—
Borea	IBI	—	Navy	—	—	—	—	—
Brasile **	IED	190	La Veloce Steam Nav. Co. ..	300, **600**	P G ..	X	0.40	—
Bronte	IVA	—	Navy	—	—	—	—	—
Calabria, IKN	IKN	—	Navy	—	—	—	—	—
Campania, IKM	IKM	—	Navy	—	—	—	—	—
Capitano Verri	IVS	—	Navy	—	—	—	—	—
Caprera	IKW	—	Navy	—	—	—	—	—
Carabiniere	IBJ	—	Navy	—	—	—	—	—
Carlo Alberto	IKA	—	Navy	—	—	—	—	—
Caserta	IYZ	190	Lloyd Italiano	300, **600**	P G ..	N	0.40	—
Cavour **	IUC	190	La Ligure Braziliana Steam Nav. Co.	300, **600**	P G ..	N	0.40	—
Ciclope	IVQ	—	Navy	—	—	—	—	—
Città di Catania	IET	—	Ferrovie dello Stato	300, **600**	—	—	—	—
Città di Messina	IEN	—	Ferrovie dello Stato	300, **600**	—	—	—	—
Città di Milano, IVJ	IVJ	—	Navy	—	—	—	—	—
Città di Palermo	IEP	—	Ferrovie dello Stato	300, **600**	—	—	—	—
Città di Siracusa	IES	—	Ferrovie dello Stato	300, **600**	—	—	—	—
Città di Torino **	IEI	190	La Veloce Steam Nav. Co. ..	300, **600**	P G ..	X	0.40	—
Coatit	IKS	—	Navy	—	—	—	—	—
Conte di Cavour	IHD	—	Navy	—	—	—	—	—
Corazziere	IBK	—	Navy	—	—	—	—	—
Cordova	IYJ	190	Lloyd Italiano	300, **600**	P G ..	X	0.40	—
Curtatone	IVL	—	Navy	—	—	—	—	—
Dandolo	IHH	—	Navy	—	—	—	—	—
Dante Alighieri	IHC	—	Navy	—	—	—	—	—
Dardo	IBL	—	Navy	300, **600**	P G ..	N	0.40	—
[illegible]	[illegible]	170	Navigazione Generale Italiana ..	[illegible]	[illegible]	N	[illegible]	—

[illegible]	IVA	—	Navy	—	—	—	—	—
Espero	IBM	—	Navy	—	—	—	—	—
Etna	IKG	—	Navy	—	—	—	—	—
Etruria	IKP	—	Navy	—	—	—	—	—
Euro	IBN	—	Navy	—	—	—	—	—
Europa, IEE [66]	IEE	270	La Veloce Steam Nav. Co	300, 600	P G	N	0.40	—
Firenze [66]	INZ	110	Compagnia Marittima Italiana	300, 600	P G	X	0.40	—
Flavio Gioja	IVE	—	Navy	—	—	—	—	—
Francesco Ferruccio	IHZ	—	Navy	—	—	—	—	—
Fuciliere	IBO	—	Navy	—	—	—	—	—
Fulmine	IBP	—	Navy	—	—	—	—	—
Galileo Galilei	IVP	—	Navy	—	—	—	—	—
Garibaldi, IUG [66]	IUG	190	La Ligure Brasiliana Steam Nav. Co.	300, 600	P G	N	0.40	—
Garibaldino	IBQ	—	Navy	—	—	—	—	—
Giovanni Bausan	IVD	—	Navy	—	—	—	—	—
Giuliana	IVT	—	Navy	—	—	—	—	—
Giulio Cesare	IHB	—	Navy	—	—	—	—	—
Giuseppe Garibaldi	IHX	—	Navy	—	—	—	—	—
Goito	IKU	—	Navy	—	—	—	—	—
Governolo	IVN	—	Navy	—	—	—	—	—
Granatiere	IBR	—	Navy	—	—	—	—	—
Impavido	IBV	—	Navy	—	—	—	—	—
Impetuoso	IBW	—	Navy	—	—	—	—	—
Indiana, IYI [66]	IYI	190	Lloyd Italiano	300, 600	P G	N	0.40	—
Indomito	IBS	—	Navy	—	—	—	—	—
Insidioso	IBT	—	Navy	—	—	—	—	—
Intrepido	IBU	—	Navy	—	—	—	—	—
Iride	IKT	—	Navy	—	—	—	—	—
Irrequieto	IBX	—	Navy	—	—	—	—	—
Italia, IHG	IHG	—	Navy	—	—	—	—	—
Italia, IZI [66]	IZI	190	Italia Steam Nav. Co.	300, 600	P G	X	0.40	—
Lampo, IBY	IBY	—	Navy	—	—	—	—	—
Lampo, ILL [66]	ILL	190	Soc. Italio-Americana pel Petrolio, Genoa	300, 600	P ..	X	0.40	—
Lanciere	IBZ	—	Navy	—	—	—	—	—
Leonardo da Vinci	IHF	—	Navy	—	—	—	—	—
Libia	IKH	—	Navy	—	—	—	—	—
Liguria	IKQ	—	Navy	—	—	—	—	—
Lombardia	IKO	—	Navy	—	—	—	—	—
Luisiana [66]	IYL	190	Lloyd Italiano	300, 600	P G	N	0.40	—
M. A. Colonna	IVR	—	Navy	—	—	—	—	—
Marco Polo	IKC	—	Navy	—	—	—	—	—
Marsala	IKE	—	Navy	—	—	—	—	—
Milano [66]	INM	110	Soc. Italiana di servizi Marittimi	300, 600	P G	X	0.40	—
Minas [66]	IUM	190	La Ligure Braziliana Steam Nav. Co.	300, 600	P G	X	0.40	—
Minerva, IKX	IKX	—	Navy	—	—	—	—	—
Misurata	IVV	—	Navy	—	—	—	—	—
Montebello	IKZ	—	Navy	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
ITALY—*contd.*							Francs.	Francs.
Napoli, IHO	IHO	—	Navy	—	—	—	—	—
Napoli, IZS **	IZS	190	Italia Steam Nav. Co.	300, **600**	P G	N	0.40	—
Nembo	IDA	—	Navy	—	—	—	—	—
Nino Bixio	IKF	—	Navy	—	—	—	—	—
Ostro	IDB	—	Navy	—	—	—	—	—
Palermo **	IZL	190	Navigazione Générale Italiana	300, **600**	P G	N	0.40	—
Partenope	IKY	—	Navy	—	—	—	—	—
Piemonte	IKJ	—	Navy	—	—	—	—	—
Pisa, IHR	IHR	—	Navy	—	—	—	—	—
Pontiere	IDC	—	Navy	—	—	—	—	—
Porto di Adalia	INA	—	Marittima Italiana	300, **600**	P G	—	—	—
Portsaid **	IND	110	Compagnia Marittima Italiana	300, **600**	P G	X	0.40	—
Principe di Udine **	IYU	270	Lloyd Sabaudo	300, **600**	P G	N	0.40	—
Principessa Mafalda **	IYM	270	Lloyd Italiana	300, **600**	P G	N	—	—
Principe Umberto **	IZU	270	Navigazione Générale Italiana	300, **600**	P G	N	0.40	—
Puglia	IKK	—	Navy	—	—	—	—	—
Quarto	IKD	—	Navy	—	—	—	—	—
Ravenna **	ITR	190	Italia Steam Nav. Co.	300, **600**	P G	N	0.40	—
Re d'Italia **	IYR	190	Lloyd Sabaudo	300, **600**	P G	N	0.40	—
Regina d'Italia **	INI	190	Compagnia Marittima Italiana	300, **600**	P G	N	0.40	—
Regina Elena, IHQ	IHQ	—	Navy	—	—	—	—	—
Regina Elena, IZE **	IZE	270	Navigazione Générale Italiana	300, **600**	P G	N	0.40	—
Regina Margherita	IHJ	—	Navy	—	—	—	—	—
Re Umberto, IHK	IHK	—	Navy	—	—	—	—	—
Re Umberto, IUU **	IUU	110	La Ligure Braziliana Steam Nav. Co.	300, **600**	P G	X	0.40	—
Re Vittorio **	IZV	270	Navigazione Générale Italiana	300, **600**	P G	N	0.40	—
Roma, IHP	IHP	—	Navy	—	—	—	—	—
Roma, INR **	INR	110	Compagnia Marittima Italiana	300, **600**	P G	X	0.40	—
Sardegna, IHM	IHM	—	Navy	—	—	—	—	—
Sardegna, INS **	INS	110	Soc. Italiana di Lanizi Marittima	300, **600**	P G	X	0.40	—
Savoia **	IEH	190	La Veloce Steam Nav. Co.	300, **600**	P G	N	0.40	—
Sebastiano Caboto	IVZ	—	Navy	—	—	—	—	—
Sicilia, IHL	IHL	—	Navy	[illegible]	[illegible]	[illegible]	[illegible]	—
Sicilia, INL **	INL	110	Soc. Italiana di Servizi Marittima	300, **600**	P G	[illegible]	0.40	—
Siena **	[illegible]	[illegible]	La Veloce Steam Nav. Co.	300, **600**	[illegible]	[illegible]	[illegible]	—

S. Giorgio,	IEA	190	Sicula Americana Nav. Co.	300, **600**	P G	N	0.40	—
S. Giorgio, IHU	IHU	—	Navy	—	—	—	—	—
S. Giovanni"	IEC	190	Sicula Americana Nav. Co.	300, **600**	P G	N	0.40	—
S. Guglielmo "	IEB	190	Sicula Americana Nav. Co.	300, **600**	P G	N	0.40	—
S. Marco	IHT	—	Navy	—	—	—	—	—
Taormina "	IYT	270	Lloyd Italiano	300, **600**	P G	N	0.40	—
Tobruk	IVW	—	Navy	—	—	—	—	—
Tomaso di Savoia "	IYS	190	Lloyd Sabaudo	300, **600**	P G	N	0.40	—
Torino	INO	110	Soc. Italiana di Servizi Marittima	300, **600**	P G	X	0.40	—
Toscana "	ITT	190	Italia Steam Nav. Co.	300, **600**	P G	N	0.40	—
Trinacria	IVC	—	Navy	—	—	—	—	—
Tripoli	IKV	—	Navy	—	—	—	—	—
Turbine	IDE	—	Navy	—	—	—	—	—
Umbrea	ITU	190	Soc. Italiana di Servizi Marittima	300, **600**	PG	X	0.40	—
Varese	IHY	—	Navy	—	—	—	—	—
Verona "	ITV	270	Navagazione Générale Italiana	300, **600**	P G	N	0.40	—
Vettor Pisani	IKB	—	Navy	—	—	—	—	—
Vittorio Emanuele	IHN	—	Navy	—	—	—	—	—
Volta	IVH	—	Navy	—	—	—	—	—
Voturno	IVM	—	Navy	—	—	—	—	—
Vulcano	IVF	—	Navy	—	—	—	—	—
Zeffiro	IDF	—	Navy	—	—	—	—	—
JAPAN								
Adzuma	JRD	—	Navy	—	O	—	—	—
Akashi	JLM	—	Navy	—	O	—	—	—
Aki	JGK	—	Navy	—	O	—	—	—
Akitsushima	JUQ	—	Navy	—	O	—	—	—
Amakusa Maru	JAM	Day, 300; night, 1000	**Osaka Mercantile S.S. Co.**	300, **600**	P G	N	0.40	—
America Maru	JAC	Day, 300 night, 1000	**Osaka Mercantile S.S. Co.**	300, **600**	P G	N	0.40	—
Anyo Maru	JAY	Day, 450; night, 900	**Oriental S.S. Co.**	300, **600**	P G	N	0.40	—
Asahi	JGB	—	Navy	—	O	—	—	—
Asama	JRA	—	Navy	—	O	—	—	—
Aso	JRL	—	Navy	—	O	—	—	—
Awa Maru	JAW	Day, 300; night, 1000	**Nippon Yusen Kaisha (Japan Mail S.S. Co.)**	300, **600**	P G	N	0.40	—
Bingo Maru	JBG	Day, 300; night, 1000	**Nippon Yusen Kaisha (Japan Mail S.S. Co.)**	300, **600**	P G	N	0.40	—
Buyo Maru	JBY	Day, 300; night, 1000	**Oriental S.S. Co.**	300, **600**	P G	N	0.40	—
Canada Maru	JCD	Day, 350; night, 1200	**Osaka Mercantile S.S. Co.**	300, **600**	P G	N	0.40	—
Chicago Maru	JCC	Day, 350; night, 1200	**Osaka Mercantile S.S. Co.**	300, **600**	P G	N	0.40	—
Chihaya	JWB	—	**Navy**	—	O	—	—	—
Chikuma	JLG	—	**Navy**	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge Per Word.	Ship Charge Minimum Charge.
JAPAN—*contd.*							Francs.	Francs.
Chitose	JLB	—	Navy	—	O	—	—	—
Chiyoda	JUP	—	Navy	—	O	—	—	—
Chiyo Maru	JCY	Day, 450; night, 1500	Oriental S.S. Co.	300, **600**	P G ..	N	0.40	—
Fuji	JUC	—	Navy	—	O	—	—	—
Fushimi	JWJ	—	Navy	—	O	—	—	—
Hashidate	JUO	—	Navy	—	O	—	—	—
Hayatori Maru	JHY	100	Ministry of Agriculture and Commerce	300, **600**	P G ..	N	0.40	—
Hiei	JGV	—	Navy	—	O	—	—	—
Hirato	JLJ	—	Navy	—	O	—	—	—
Hizen	JGD	—	Navy	—	O	—	—	—
Hongkong Maru	JHN	Day, 300; night, 1000	Oriental S.S. Co.	300, **600**	P G ..	N	0.40	—
Ibuki	JGT	—	Navy	—	O	—	—	—
Idzumo	JRG	—	Navy	—	O	—	—	—
Iki	JUA	—	Navy	—	O	—	—	—
Ikoma	JGQ	—	Navy	—	O	—	—	—
Itsukushima	JUN	—	Navy	—	O	—	—	—
Iwami	JUD	—	Navy	—	O	—	—	—
Iwate	JRF	—	Navy	—	O	—	—	—
Kagi Maru	JKG	Day, 300; night, 1000	Osaka Mercantile S.S. Co. ..	300, **600**	P G ..	N	0.40	—
Karasaki	JUV	—	Navy	—	O	—	—	—
Kasado Maru	JKT	Day, 300; night, 1000	Osaka Mercantile S.S. Co. ..	300, **600**	P G ..	N	0.40	—
Kasagi	JLA	—	Navy	—	O	—	—	—
Kashima	JGG	—	Navy	—	O	—	—	—
Kasuga	JRJ	—	Navy	—	O	—	—	—
Katori	JGF	—	Navy	—	O	—	—	—
Kawachi	JGL	—	Navy	—	O	—	—	—
Kayo Maru	JKO	Day, 250; night, 800	K. Oaki	300, **600**	P G ..	N	0.40	—
Kiyo Maru	JKY	Day, 250; night, 800	Oriental S.S Co.	300, **600**	P G ..	N	0.40	—
Kobe Maru	JKB	[illegible]	Nippon Yusen Kaisha (Japan [illegible]	300, **600**	P G ..	N	0.40	—

Mexico Maru	JMX	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Mikasa	JGC	—	Navy	—	O	—	—	—
Mishima	JUL	—	Navy	—	O	—	—	—
Mogami	JWD	—	Navy	—	O	—	—	—
Musashi	JUY	—	Navy	—	O	—	—	—
Niitaka	JLN	—	Navy	—	O	—	—	—
Nippon Maru	JNP	Day, 300; night, 1000	Oriental S.S. Co.	300, 600	P G	N	0.40	—
Nisshin	JRK	—	Navy	—	O	—	—	—
Okinoshima	JUK	—	Navy	—	O	—	—	—
Otowa	JLP	—	Navy	—	O	—	—	—
Panama Maru	JPM	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Sado Maru	JSD	Day, 300; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Saga, JWL	JWL	—	Navy	—	O	—	—	—
Sagami	JUF	—	Navy	—	O	—	—	—
Sakaki Maru	JKI	Day, 400; night, 1200	Minami Manshu Tetsudo Kaisha	300, 600	P G	N	0.40	—
Sanuki Maru	JSA	300	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Satsuma	JGJ	—	Navy	—	O	—	—	—
Seattle Maru	JST	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Settsu	JGM	—	Navy	—	O	—	—	—
Shidzuoka Maru	JSZ	Day, 350; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Shikishima	JGA	—	Navy	—	O	—	—	—
Shinano Maru	JSN	Day, 350; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Shinyo Maru	JSH	Day, 450; night, 1500	Oriental S.S. Co.	300, 600	P G	N	0.40	—
Soya	JLD	—	Navy	—	O	—	—	—
Suma	JLL	—	Navy	—	O	—	—	—
Sumida	JWG	—	Navy	—	O	—	—	—
Suwo	JUG	—	Navy	—	O	—	—	—
Tacoma Maru	JTA	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Taichu Maru	JTC	Day, 300; night, 1000	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Tainan Maru	JTN	Day, 300; night, 1000	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Taisei Maru	JTM	Day, 300; night, 1000	Mercantile Marine School	300, 600	P G	N	0.40	—
Takachiho	JUM	—	Navy	—	O	—	—	—
Tamba Maru	JTB	Day, 300; night, 1000	Nippon Yusan Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Tango	JUB	—	Navy	—	O	—	—	—
Tatsuta	JWA	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
JAPAN—*contd.*							Francs.	Francs.
Teikoku Maru	JTK	Day, 350; night, 900	Minami Manshu Kisen Kaisha	300, **600**	P G	N	0.40	—
Tenyo Maru	JTY	Day, 450; night, 1500	Oriental S.S. Co.	300, **600**	P G	N	0.40	—
Toba	JWK	—	Navy	—	O	—	—	—
Tokiwa	JRB	—	Navy	—	O	—	—	—
Tone	JLF	—	Navy	—	O	—	—	—
Toyohashi	JUU	—	Navy	—	O	—	—	—
Tsugaru	JLC	—	Navy	—	O	—	—	—
Tsukuba	JGP	—	Navy	—	O	—	—	—
Tsushima	JLO	—	Navy	—	O	—	—	—
Uji	JWF	—	Navy	—	O	—	—	—
Yahagi	JLK	—	Navy	—	O	—	—	—
Yakumo	JRC	—	Navy	—	O	—	—	—
Yamato	JUX	—	Navy	—	O	—	—	—
Yodo	JWC	—	Navy	—	O	—	—	—
Yokohama Maru	JYH	Day, 350; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—
MEXICO								
Mexico	XBB	250	Compania Mexicana de Nav. S.A.	300, **600**	P G	X	0.40	—
Mexicano	XBC	250	Cia Mexicanade Combustible	300, **600**	P G	X	0.40	—
San Antonio	—	250	Cia Mexicana de Vap San Antonio S.A.	300, **600**	P G	X	0.40	—
San Bernardo	XBA	250	Cia Mexicanade Petroleo "El Aguila," S.A.	300, **600**	P G	X	0.40	—
MONACO								
Hirondelle (yacht)	CQA	380	Prince of Monaco	300, **600**	P	X	—	—
NEW ZEALAND								
Aorangi	VLI	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Atua	VLU	325	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Hauroto	VLH	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Hinemoa	VLS	Day, 300; night, 700	New Zealand Government	—	—	—	—	—

Manapouri		night, 700						—
Manuka..	VLP	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Marama	VLN	325	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Maunganui	VLR	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Moana ..	VLG	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Moeraki..	VLO	325	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Mokoia ..	VLM	325	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Moura ..	VMK	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
	VMM	Day, 300; night, 700	Union S.S. Co. of New Zealand ..	—	—	—	—	—
Navua ..	VLV	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Niagara	GBE	Day, 300; night, 700	Union S.S. Co. of New Zealand ..	—	—	—	—	—
Paloona..	VLY	Day, 300; night, 700	Union S.S. Co. of New Zealand ..	—	—	—	—	—
Roscommon	VHR	Day, 300; night, 700	New Zealand Shipping Co. ..	—	—	—	—	—
Tahiti ..	MYN	Day, 300; night, 700	Union S.S. Co. of New Zealand ..	—	—	—	—	—
Talune ..	VLL	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Tofua ..	VLF	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Tutanekai	VLX	325	Government Cable Ship ..	300, 600	O ..	X	—	—
Warrimoo	VLQ	250	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
Wahine	VLJ	Day, 250; night, 500	Union S.S. Co. of New Zealand ..	300, 600	P G ..	X	0.40	—
NORWAY								
A 1 ..	LAU	—	Navy ..	—	O ..	—	—	—
A 2 ..	LAV	—	Navy ..	—	O ..	—	—	—
A 3 ..	LAW	—	Navy ..	—	O ..	—	—	—
A 4 ..	LAX	—	Navy ..	—	O ..	—	—	—
A 5 ..	LAY	—	Navy ..	—	O ..	—	—	—
Bergensfjord [u]	LFB	200	Den Norske-Amerika-Linje ..	300, 450, 600	P G ..	N	0.40	4.00
Bessheim [u]	LDA	160	F. Olsen Line ..	300, 450, 600	P G ..	N	0.28	2.80
Björgvin	LBB	—	Navy ..	—	O ..	—	—	—
Borgestad [u]	LDZ	150	A/S Borgestad (G. Knudsen), Porsgrund	300, 450, 600	P G ..	X	0.40	4.00
City of Mexico ..	LEJ	—	Wolvin Line ..	300, 600	—	—	0.40	4.00
Commonwealth, LDD	LDD	40	Chr. Nielsen & Co., Larvik ..	300, 450, 600	P R ..	X	—	—
Correct ..	LEA	120	Sebirian S.S. Manufacturing & Trading Co., Ltd.	300, 600	P G ..	X	—	—
Cuzco ..	—	—	Grace, W. R. & Co. ..	300, 600	— ..	—	0.40	4.00
Draug ..	LAI	—	Navy ..	—	O ..	—	—	—
Eidsvold	LAA	—	Navy ..	—	O ..	—	—	—
Ellida ..	LAG	—	Navy ..	—	O ..	—	—	—
Ellis ..	—	—	Irgens, O. & A. ..	300, 600	—	—	0.40	4.00
Frithjof, LAE ..	LAE	—	Navy ..	—	O ..	—	—	—
Garm ..	LBC	—	Navy ..	—	O ..	—	—	—
Haakon VII. ..	LDL	160	Det Nordenfjeldske Dampskibsselskab	300, 450, 600	P G ..	1 a.m. to 3 a.m., 7 a.m. to 9 a.m., 1 p.m. to 3 p.m., 7 p.m. to 9 p.m.	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
NORWAY—*contd.*							Francs.	Francs.
Harald Haarfagre	LAB	—	Navy	—	O	—	—	—
Heimdal	LAZ	—	Navy	—	O	—	—	—
Hektoria	LCA	Day, 270; night, 540	N. Bugge, Tönsberg	300, **600**	P G	X	0.30	3.00
Hval	LAN	—	Navy	—	O	—	—	—
Irma	LDQ	Day, 240; night, 480	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	X	0.40	4.00
Jason	—	—	Aktiebolage Dampskibsselskab Jason	300, **600**	—	—	0.40	4.00
Jo	LAQ	—	Navy	—	O	—	—	—
Johan Brijde	—	—	Ostkystens Hvalfangerskab	300, **600**	—	—	0.40	4.00
Karrakatta	LDE	40	Chr. Nielsen & Co., Larvik	300, 450, **600**	P R	X	—	—
Kjell	LAT	—	Navy	—	O	—	—	—
Kong Harald	LDK	160	Det Nordenfjeldske Dampskibsselskab	300, 450, **600**	P G	1 a.m. to 3 a.m., 7 a.m. to 9 a.m., 1 p.m. to 3 p.m., 7 p.m. to 9 p.m.	0.20	2.00
Klem	LDI	40	Chr. Nielsen & Co., Larvik	300, 450, **600**	P R	X	—	—
Kristianiafjord [11]	LFK	200	Den Norske Amerika-Linje	300, 450, **600**	P G	N	0.40	4.00
Lom	LAP	—	Navy	—	O	—	—	—
Mexicano	LDH	270–320	Norway-Mexico Gulf Line	300, **600**	P G	8 a.m. to 12 p.m.	0.40	4.00
Nidaros	LBA	—	Navy	—	O	—	—	—
Norge	LAC	—	Navy	—	O	—	—	—
Noruega [11]	LDG	180	Norway-Mexico Gulf Line	300, **600**	P G	8 a.m. to 12 p.m.	0.40	4.00
Obidense [11]	LEB	100	Cuneo Importing Co.	300, **600**	P G	X	0.40	4.00
Orn II. [11]	LDV	160–270	Chr. Nielsen & Co., Larvik	300, 450, **600**	P G	X	0.40	4.00
Preston	—	—	Irgens, O. & A.	300, **600**	—	—	0.40	4.00
Ragnvald Jarl	LDJ	160	Det Nordenfjeldske Dampskibsselskab	300, 450, **600**	P G	1 a.m to 3 a.m., 7 a.m. to 9 a.m., 1 p.m. to 3 p.m., 7 p.m. to 9 p.m.	0.20	2.00
Ronald	LCB	Day, 270; night, 540	N. Bugge, Tönsberg	300, **600**	P G	X	0.30	3.00
Sæl	LAL	—	Navy	—	O	—	—	—
Skarv	LAR	—	Navy	—	O	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.80

Troll	LAJ	—	Navy	—	O ..	..	—	—	—
Tyr	LAH	—	Navy	—	O ..	..	—	—	—
Valkyrien, LAK	LAK	—	Navy	—	O ..	..	—	—	—
Vega	LDP	Day, 240; night, 480	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	..	X	0.40	4.00
Venus, LDO	LDO	Day, 240; night, 480	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	..	X	0.40	4.00
Viking, LAF	LAF	—	Navy	—	O	..	—	—	—
Zeta	LDR	Day, 80; night, 160	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	..	X	0.40	4.00
PERU									
Huallaga	MWS	250	Cia Peruana Vap y Dique del Callao	300, **600**	P G	..	X	0.40	—
Mantaro	MFE	250	Cia Peruana Vap y Dique del Callao	300, **600**	P G	..	X	0.40	—
Pachitea	MFF	250	Cia Peruana Vap y Dique del Callao	300, **600**	P G	..	X	0.40	—
Ucayali	MSG	250	Cia Peruana Vap y Dique del Callao	300, **600**	P G	..	X	0.40	—
Umbamba	MFG	250	Cia Peruana Vap y Dique del Callao	300, **600**	P G	..	X	0.40	—
PORTUGAL									
Adamastor	CTC	150	Navy	300, 450, **600**	O ..	..	N	—	—
Africa, CSA [11]	CSA	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**800**, 450, **600**	P G	..	N	0.40	4.00
Almirante Reis	CTA	150	Navy	300, 450, **600**	O ..	..	N	—	—
Ambaca [11]	CSY	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	..	X	0.40	4.00
Beira	CSB	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**800**, 450, 600	P G	..	N	0.40	4.00
Bolama [11]	CSO	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	..	X	0.40	4.00
Cazengo [11]	CSC	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	..	X	0.40	4.00
Funchal [11]	CSF	100–150	Empreza Insulana de Navegaçao, Lisbon	300, **600**	P G	..	X	0.40	4.00
Guine [11]	CSG	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	..	X	0.40	4.00
Loanda [11]	CSL	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	..	X	0.40	4.00
Malange [11]	CSN	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	..	X	0.40	4.00
Moçambique	CSM	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**800**, 450, 600	P G	..	N	0.40	4.00
Portugal	CSP	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**800**, 450, 600	P G	..	N	0.40	4.00
S. Gabriel	CTD	150	Navy	300, 450, **600**	O ..	..	N	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
PORTUGAL—*contd.*							Francs.	Francs.
S. Miguel[11]	CSS	100–150	Empreza Insulana de Navegaçao, Lisbon	300, **600**	P G	X	0.40	4.00
Vasco da Gama	CTB	150	Navy	300, 450, **600**	O	N	—	—
Zaire[11]	CSZ	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
ROUMANIA								
Dacia, CVD	CVD	240	Government Marine Department	600	P R[67]	N	—[68]	—[68]
Imparatul Traian	CVF	240	Government Marine Department	600	P R[67]	N	—[68]	—[68]
Principesa Maria	CVM	240	Government Marine Department	600	P R[67]	N	—[68]	—[68]
Regele Carol I.	CVC	240	Government Marine Department	600	P R[67]	N	—[68]	—[68]
Romania	CVR	240	Government Marine Department	600	P R[67]	N	—[68]	—[68]
RUSSIA						Time of St. Petersburg		
Admiral Makharoff	RGK	—	Navy	—	O	—	—	—
Admiral Zavoïko	RNZ	125	Administration of the Province of Kamchatka	300, **600**	P G	8 a.m. to 9 a.m., 3 p.m. to 4 p.m., 10 p.m. to 11 p.m.	0.40	—
Afon	RPA	450	Cie Russe de Nav. á vapeur de l'Asie Orientale	300, **600**	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40	—
Aleksandria	RFI	—	Navy	—	O	—	—	—
Almaz	RKU	—	Navy	—	O	—	—	—
Amour	RGP	—	Navy	—	O	—	—	—
Andrei Pervozvannyi	RGB	—	Navy	—	O	—	—	—
Angara	RIB	—	Navy	—	O	—	—	—
Askold	RMA	—	Navy	—	O	—	—	—
Avrora	RGO	—	Navy	—	O	—	—	—
Baian	RGJ	—	Navy	—	O	—	—	—
Berezan	RKZ	—	Navy	—	O	—	—	—
Birma	RSA	200	Cie Russe de Nav. à vapeur de l'Asie Orientale	300, **600**	P G	N	0.40[69]	—[69]
Bobr	[illegible]	—	[illegible]	—	O	—	—	—

Dwinsk	RDK	—	Russian East Asiatic Co.	300, 600	O	—	—	—
Emir Boukharski	RHK	—	Navy	—	O	—	—	—
Ennissey	RGQ	—	Navy	—	O	—	—	—
Evstafi	RKA	—	Navy	—	O	—	—	—
Finn	RHL	—	Navy	—	O	—	—	—
Gaidamak	RHQ	—	Navy	—	O	—	—	—
General Kondratienko	RHC	—	Navy	—	O	—	—	—
Gheorgii Pobedonosets	RKI	—	Navy	—	O	—	—	—
Gromoboi	RGI	—	Navy	—	O	—	—	—
Guiliak	RGZ	—	Navy	—	O	—	—	—
Imperator Nicolai II.	RPB	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [65]	— [66]
Imperator Pavel I.	RGC	—	Navy	—	O	—	—	—
Ioann Zlatooust	RKC	—	Navy	—	O	—	—	—
Iolanda (s.y.)	—	200	Madame Elisabeth Brestchenko	300, 600	P G	X	0.40	—
Jérusalem	RPI	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40 [67]	— [69]
Kagoul	RKM	—	Navy	—	O	—	—	—
Kama	RID	—	Navy	—	O	—	—	—
Kapitan Leitenant Baranoff	RLE	—	Navy	—	O	—	—	—
Kapitan Saken	RLC	—	Navy	—	O	—	—	—
Kazanets	RHU	—	Navy	—	O	—	—	—
Khrabryi	RGU	—	Navy	—	O	—	—	—
Korects	RGV	—	Navy	—	O	—	—	—
Koroléva Olga	RPL	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [68]	—
Koubanetz	RKS	—	Navy	—	O	—	—	—
Koursk	RSK	180	Cie Russe de Nav. à Vapeur de l'Asie Orientale	300, 600	P G	N	0.40	—
Kronstadt	RKX	—	Navy	—	O	—	—	—
Leitenant Chestakoff	RLB	—	Navy	—	O	—	—	—
Leitenant Zatsarennyi	RLD	—	Navy	—	O	—	—	—
Mandjour	RMF	—	Navy	—	O	—	—	—
Mangougai	RMB	—	Navy	—	O	—	—	—
Mezen	RIJ	—	Navy	—	O	—	—	—
Moskvitiania	RHN	—	Navy	—	O	—	—	—
Neva	RFF	—	Navy	—	O	—	—	—
Nikolaeff	RGT	—	Navy	—	O	—	—	—
Novik	RHA	—	Navy	—	O	—	—	—
Odessa	RPE	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [68]	— [69]
Oka	RIC	—	Navy	—	O	—	—	—
Okean	RGR	—	Navy	—	O	—	—	—
Okhotnik	RHF	—	Navy	—	O	—	—	—
Oleg	RGN	—	Navy	—	O	—	—	—
Oukraina	RHT	—	Navy	—	O	—	—	—

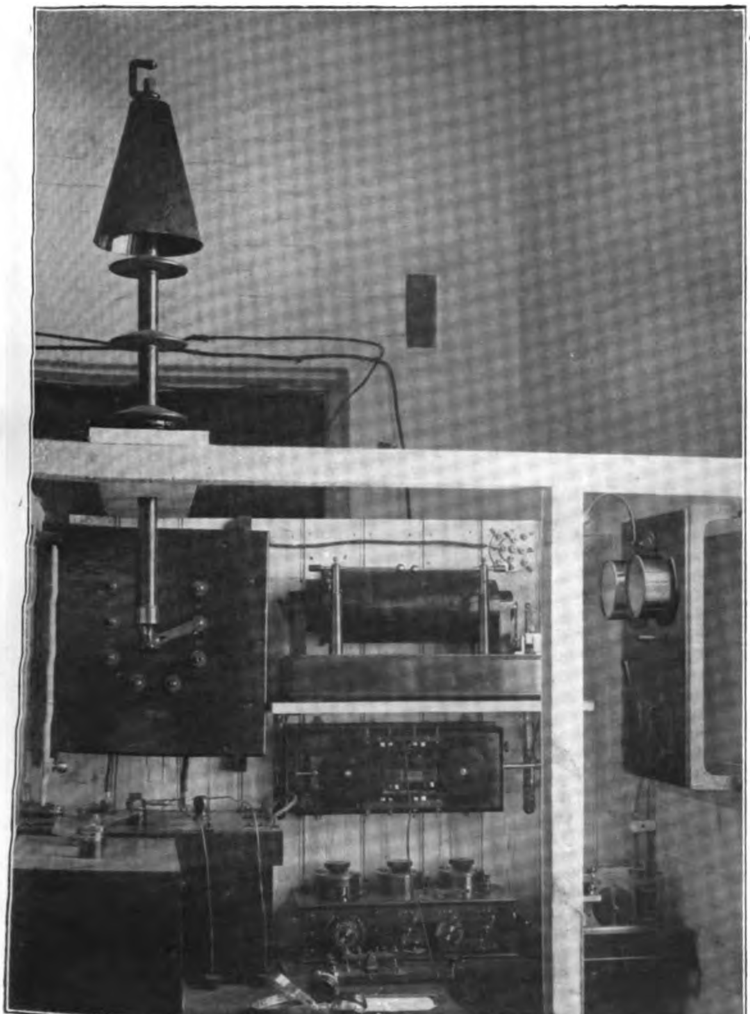
Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
RUSSIA—*contd.*						Time of St. Petersburg.	Francs.	Francs
Ouraletz	RKP	—	Navy	—	O	—	—	—
Oussouriets	RHR	—	Navy	—	O	—	—	—
Oussourri	RMD	—	Navy	—	O	—	—	—
Pallada	RGS	—	Navy	—	O	—	—	—
Pamiat Merkouria	RKL	—	Navy	—	O	—	—	—
Panteleimon	RKD	—	Navy	—	O	—	—	—
Pechora	RIE	—	Navy	—	O	—	—	—
Piotre Véliki	RPR	110	Committee of the Riga Stock Exchange	300, **600**	P G	—[71]	0.40	—
Pogranitchnik	RHI	—	Navy	—	O	—	—	—
Polezny	RPZ	100	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40[69]	—[69]
Poliarnaya Zviezda	RFD	—	Navy	—	O	—	—	—
Prinzessa Evguénia Oldenbourgskaia	RPH	300	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G	12 a.m. to 2 p.m.[70] 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40[69]	—[69]
Prout	RKV	—	Navy	—	O	—	—	—
Riga	RIK	—	Navy	—	O	—	—	—
Rossia, RGL	RGL	—	Navy	—	O	—	—	—
Rossia, RSR	RSR	300–600	Cie Russe de Nav. à vapeur de l'Asie Orientale	300	P G	8 a.m. to 9 a.m., 3 p.m. to 4 p.m., 9 p.m. to 10 p.m.	0.40	—
Rostislav	RKF	—	Navy	—	O	—	—	—
Rurik	RGA	—	Navy	—	O	—	—	—
Sibirskii strelok	RHB	—	Navy	—	O	—	—	—
Sinop	RKG	—	Navy	—	O	—	—	—
Sivouch	RGX	—	Navy	—	O	—	—	—
Slava	RGH	—	Navy	—	O	—	—	—
Soukhona	RIG	—	Navy	—	O	—	—	—
Standart	RFB	—	Navy	—	O	—	—	—
Stavropol	RNS	100	Volunteer Fleet	300, **600**	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40[69]	—[69]
Stereguchtll	RHZ	—	Navy	—	O	—	—	—
[illegible]	[illegible]	—	Navy	—	O	—	—	—

Tourkmen Stavropolskii ..	RKT	—	Navy	—	O	... p.m., 2 a.m. to 4 a.m.	—	—
Tri Sviatitelia	RHS	—	Navy	—	O	—	—	—
Tsar	RKE	—	Navy	—	O	—	—	—
	RSC	160	Cie Russe de Nav. à vapeur de l'Asie Orientale	300, **600**	P G ..	N	0.40 [69]	—
Tsesarevitch	RGF	—	Navy	—	O	—	—	—
Tsésarévitch Gueorgui ..	RPF	300	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G ..	2 a.m.. to 4 a.m.,[70] 12 a.m. to 2 p.m.,[70] 6 p.m. to 8 p.m.[70]	0.40 [69]	—[69]
Tver	RNT	210	Volunteer Fleet	300, **600**	P G ..	5 a.m. to 8 a.m., 1 .m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	—[69]
Vaiguatch	RML	—	Navy	—	O	—	—	—
Vélikaïa-Kniaguinia-Xénia ..	RPG	300	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G ..	12 a.m. to 2 p.m., 8 a.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40 [69]	—[69]
Véliki-Kniaz Alexandre ..	RPW	300	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40 [69]	—[69]
Véliki-Kniaz Alexii	RPQ	300	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G ..	12 a.m. to 2 p.m.,[70] 6 p.m. to 8 p.m.,[70] 2 a.m. to 4 a.m.[70]	0.40 [69]	—[69]
Véliki Kniaz Constantine ..	RPO	300	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G ..	2 a.m. to 4 a.m.,[70] 12 a.m. to 2 p.m.,[70] 6 p.m. to 8 p.m.[70]	0.40 [69]	—[69]
Voiskovoi	RIA	—	Navy	—	O	—	—	—
Vsadnik	RHP	—	Navy	—	O	—	—	—
Zabaikalets	RHX	—	Navy	—	O	—	—	—
Zemtchoug	RMB	—	Navy	—	O	—	—	—
SOUTH AFRICA (UNION OF)								
Ludwig Wiener	VNA	100	Government Tug	300, **600**	O	—	—	—
SPAIN								
A. Lazaro	EEL	180	La Roda y Compañia	300, 450, **600**	P G ..	—[72]	0.30	3.00
Alcira	EEQ	100	La Roda y Compañia	300, **600**	P G ..	—[72]	0.30	3.00
Alfonso XII.[11]	EDD	269	Compañia Transatlantica Española	300, **600**	P G ..	N	0.30	3.00
Alfonso XIII.[11]	EDT	269	Compañia Transatlantica Española	300, **600**	P G ..	N	0.30	3.00
Alicante[11]	EDA	269	Compañia Transatlantica Española	300, **600**	P G ..	N	0.30	3.00
Alvaro de Bazán	EBM	81	Navy	300, **600**	O	N	—	—
Antonio Lopez[11]	EDL	269	Compañia Transatlantica Española	300, **600**	P G ..	N	0.30	3.00
Atlante	EFA	—	Navegacio è Industria	300, **600**	P G ..	—	0.30	3.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
SPAIN—*contd.*							Francs.	Francs.
Auxias March	EEA	180	La Roda y Compañia	300, 450, **600**	P G	—[n]	0.30	3.00
Balear	EFR	—	Cia Isleno Maritima	300, **600**	P G	—	0.30	3.00
Balmes [11]	ECA	300	Pinillos Izquierdo y Compañia	300, 450, **600**	P G	N	0.30	3.00
Barcelo	EEB	180	La Roda y Compañia	300, 450, **600**	P G	—[n]	0.30	3.00
Barcelona ECB [11]	ECB	300	Pinillos Izquierdo y Compañia	300, 450, **600**	P G	N	0.30	3.00
Bellver	EFB	—	Cia Isleno Maritima	300, **600**	P G	—	0.30	3.00
Buenos Aires, EDB [11]	EDB	269	Compañia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
Cabañal	EEC	180	La Roda y Compañia	300, 450, **600**	P G	—[n]	0.30	3.00
Cadiz [11]	ECC	300	Pinillos Izquierdo y Compañia	300, 450, **600**	P G	N	0.30	3.00
Canalejas	EEK	100	La Roda y Compañia	300, **600**	P G	—[n]	0.30	3.00
Catalina [11]	ECT	300	Pinillos Izquierdo y Compania	300, 450, **600**	P G	N	0.30	3.00
Cataluña	EFC	—	Cia Isleno Maritima	300, **600**	P G	—	0.30	3.00
Cataluña, EBF	EBF	216	Navy	300, 450, 550	O	N	—	—
Cataluña, EDC [11]	EDC	108	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
C. de Ilizaguirre [11]	EDE	269	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
Ciudad de Cadiz [11]	EDZ	108	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
C. Lopez y Lopez [11]	EDH	269	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
Conde Wifredo [11]	ECW	300	Pinillos Izquierdoy Compañia	300, 450, **600**	P G	N	0.30	3.00
Delfin	EFD	—	Navegacio è Industria	300, **600**	P G	—	0.30	3.00
Denia	EED	100	La Roda y Compañia	300, **600**	P G	—[n]	0.30	3.00
Emperador Carlos V.	EBE	243	Navy	300, **750**	O	N	—	—
Extremadura	EBJ	43	Navy	**300**, 525	O	N	—	—
Fernando Poo [11]	EDF	269	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
Francoli	EFF	—	Tintore y Cia	300, **600**	P G	—	0.30	3.00
Giralda	EBI	270	Navy	300, 500, **600** 1,000	O	N	—	—
Grao	EEG	100	La Roda y Compañia	300, **600**	P G	—[n]	0.30	3.00
Hesperides, EFH [11]	EFH	300	Navegacio o Industria	300, 450, **600**	P G	N	0.30	3.00
Infanta Isabel, EBL	EBL	216	Navy	**300**, 450	O	N	—	—
Infanta Isabel, ECY [11]	ECY	300	Pinillos Iziquierdo Compañia	300, 450, **600**	P G	N	0.30	3.00
Infanta Isabel de Borbon [11]	EDI	431	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
Isla Depanay [11]	EDP	269	Cia Transatlantica Espagñola	300, **600**	P G	N	0.30	3.00
Isla de Menorca	EFO	—	La Maritima cia Mahonesa	300, **600**	P G	—	0.30	3.00
Isleno	[illegible]	—	Cia Isleno Maritima	300, **600**	P G	—	0.30	3.00
Jatiba	[illegible]	[illegible]	[illegible]	300, **600**	P G	[illegible]	0.30	3.00



1½ k.w. Standard Ship Station.

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[illegible] ..	EFL	—	Cia Isleno Maritima	300, 600	P G ..	—	0.30	3.00
Manuel Calvo [n]	EDM	269	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Mahon	EFT	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
Martin Sænz [n]	ECZ	300	Linillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Menorquin	EFN	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
Miguel M. Pinillos [n]	ECP	300	Pinillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Miramar	EFM	—	Cia Isleno Maritima	300, 600	P G ..	—	0.30	3.00
Monté Toro	EFQ	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
M. Benlluire	EEM	180	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
M. L. Villaverde [n]	EDW	108	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Montevideo, EDV [n]	EDV	269	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Montserrat [n]	EDN	269	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Pelayo	EBD	270	Navy	300, 600, 900, 1,200	O	N	—	—
Pio IX. [n]	ECN	300	Pinillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Princesa de Asturias	EBG	324	Navy	300, 600, 800, 1,000	O	N	—	—
P. de Satrustegui [n]	EDS	431	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Reina Maria Cristina [n] ..	EDK	431	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Reina Regente..	EBH	270	Navy	300, 600, 700 1,000	O	N	—	—
Reina Victoria [n]	EFV	300	Navegacion è Industria	300, 450, 600	P G ..	N	0.30	3.00
Reina Victoria Eugenia [n] ..	EDU	431	Cia Transatlantica Espagñola ..	300, 600	P G ..	N	0.30	3.00
Rey Jaime I.	EFJ	—	Cia Isleno Maritima	300, 600	P G ..	—	0.30	3.00
Rey Jaime II.	EFS	—	Cia Isleno Maritima	300, 600	P G ..	—	0.30	3.00
Rio de la Plata, EBK ..	EBK	—	Navy	—	O	N	—	—
Sagunto	EEO	180	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
Sitges	EFS	—	J. J. Sitges freres	300, 600	P G ..	—	0.30	3.00
Teodoro Llorente	EET	180	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
Torreblanca	—	—	Tintoré y Cia	300, 600	P G ..	—	0.30	3.00
Turia [n]	EFU	250	Tintoré y Cia	300, 450, 600	P G ..	N	0.30	3.00
Valbanera [n]	ECV	300	Pinillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Vicente Ferrer	EEF	100	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
Vicente La Roda	EER	180	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
Vicente Sanz	EEZ	100	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
Villarreal	EEW	180	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
V. Puchol	EEP	180	La Roda y Compañia	300, 600	P G ..	—[n]	0.30	3.00
SWEDEN								
Abisko [n]	SFL	150	Reder. Lulea-Ofoten	300, 450, 600	P R ..	8 a.m. to 8.15 a.m., 12 a.m., to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. 8.15 p.m.	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
SWEDEN—*contd.*								
Africanic	SFS	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	Francs. 0.28	Francs. 2.80
Aran	SBH	—	Navy	—	O	—	—	—
Atlantic	SFT	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2·80
Australic	SFH	250	Reder. Transatlantica Gothenburg (Gothenburg-Australia Line)	300, **600**, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Baltic, SFU	SFU	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Bia	SFR	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Blenda	SBX	—	Navy	—	O	—	—	—
Claes Horn	SBQ	—	Navy	—	O	—	—	—
Clas Flemming	SCI	—	Navy	—	O	—	—	—
Clas Uggla	SBR	—	Navy	—	O	—	—	—
[illegible]	[illegible]		Navy	—	O	—	—	—
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

						a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.		
Hugin	SCE	—	Navy	—	O	—	—	—
Indianic	SFE	250	Gothenburg-Australia Line ..	300, 600, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Jacob Bagge	SBP	—	Navy	—	O	—	—	—
John Ericsson	SBN	—	Navy	—	O	—	—	—
Khalix	SFQ	—	Reder. Lulea-Ofoten	300, 600	—	—	0.40	4.00
Kiruna[11]	SFN	150	Reder. Lulea-Ofoten	300, 450, 600	P R ..	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Konung Gustaf V.[79]	SEA	—	State Railways	300, 450, 600[73]	P R,[74] O[75]	N	—[76]	—[76]
Kratos	SFQ	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, 600	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Magne	SBZ	—	Navy	—	O	—	—	—
Manligheten	SBK	—	Navy	—	O	—	—	—
Mode	SBY	—	Navy	—	O	—	—	—
Munin	SCF	—	Navy	—	O	—	—	—
Murjek[11]	SFI	150	Reder. Lulea-Ofoten	300, 450, 600	P R ..	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Niord	SBF	—	Navy	—	O	—	—	—
Norrbotten[11]	SFK	150	Reder. Lulea-Ofoten	300, 450, 600	P R ..	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Oden	SBD	—	Navy	—	O	—	—	—
Ornen	SBO	—	Navy	—	O	—	—	—
Oscar II., SBL	SBL	—	Navy	—	O	—	—	—
Psilander	SBS	—	Navy	—	O	—	—	—
Ragnar	SCB	—	Navy	—	O	—	—	—
Rota	SBT	—	Navy	—	O	—	—	—
Saga, SFB	SFB	150	Angfartygsaktiebolaget Thule, (Gothenburg-London Line)	300, 600	P G ..	N	0.28	2.80
S. Paul	SFA	150	Wilson et Cie, Gothenburg ..	300, 450, 600	P G ..	N	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
SWEDEN—*contd.*							Francs.	Francs.
Sigurd	SCC	—	Navy	—	O	—	—	—
Sir Ernest Cassel [11]	SFP	150	Reder. Lulea-Ofoten	300, **600**	P R	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m., to 8.15 p.m.	0.40	4.00
Skäggald	SCJ	—	Navy	—	O	—	—	—
Skuld	SBU	—	Navy	—	O	—	—	—
Svea	SBA	—	Navy	—	O	—	—	—
Svensksund	SCK	—	Navy	—	O	—	—	—
Sverige	SCL	—	Navy	—	O	—	—	—
Tapperheten	SBJ	—	Navy	—	O	—	—	—
Tasmanic	SFG	250	Gothenburg-Australia Line	300, **600**, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Texas [11]	SFD	200	Svenska Amerika-Mexico Lingen	300, **600**	P G	4 p.m. to 8 a.m.,[77] 6 p.m. to 6 a.m.[70]	0.40	4.00
Thor	SBE	—	Navy	—	O	—	—	—
Thordön	SCH	—	Navy	—	O	—	—	—
Thule, SBC	SBC	—	Navy	—	O	—	—	—
Thule, SFC	SFC	150	Angfartygsaktiebolaget Thule, Gothenburg (Gothenburg-London Line)	300, **600**	P G	N	0.28	2.80
Tirfing	SCG	—	Navy	—	O	—	—	—
Torne [11]	SFJ	150	Reder. Lulea-Ofoten	300, 450, **600**	P R	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Urd	SCM	—	Navy	—	O	—	—	—
Vidar	SCD	—	Navy	—	O	—	—	—
Vollrath Tham	[illegible]	150	Reder. Lulea-Ofoten	300, **600**	P R	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to [illegible]	0.40	4.00

URUGUAY								
18 de Julio	UDJ	55	Navy	450, **600**	O	—	—	—
Ingeniero	UIG	55	Navy	600	O	—	—	—
Maldonado	UGD	55	Navy	450, **600**	O	—	—	—
Montevideo, UCR	UCR	220	Navy	450, **600**	O	—	—	—
Oyarvide	UYB	55	Hydrographic Service	450, **600**	O	—	—	—
Uruguay, URU	URU	220	Navy	450, **600**	O	—	—	—
UNITED STATES OF AMERICA.								
Abarenda	NOB	—	Navy	600	O, PR	—	0.20	2.00
Acushnet	NRU	75	Revenue-Cutter	300	O, P R	N	0.20	2.00
Adeline Smith	WHS	—	Inter-Ocean Transportation Co.	—	—	—	—	—
Admiral Dewey	KUV	200	American Mail S.S. Co.	300, **600**	P G	N	0.20, 0.40	2.00, 4.00
Admiral Farragut	WAF	—	American Mail S.S. Co.	—	—	—	—	—
Admiral Sampson	WAS	—	Alaska Pacific S.S. Co.	—	—	—	—	—
Admiral Schley	KUX	—	American Mail S.S. Co.	—	—	—	—	—
Advance	KMV	200	Panama Railroad Co.	300, **600**	P G	N	0.20	2.00
Adventuress	KYV	—	John Borden	—	—	—	—	—
Aileen	—	—	Navy	—	—	—	—	—
Ajax, NBH	NBH	—	Navy	600	O, P R	—	0.20	2.00
Alabama	KSX	—	Baltimore Steam Packet Co.	—	—	—	—	—
Alabama, NBI	NBI	—	Navy	600	O, P R	—	0.20	2.00
Alabama, WFB	WFB	100	Goodrich Transit Co.	300, **600**	P G	N	0.20	2.00
Alameda	WAA	—	Alaska S.S. Co.	—	—	—	—	—
Alamo	KEJ	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Alba, (El)	KKL	200	Southern Pacific Co.	300, **600**	P G	X	0.20	2.00
Albany, NBJ	NBJ	—	Navy	600	O. P R	—	0.20	2.00
Alert, NBL	NBL	—	Navy	600	O, P R	—	0.20	2.00
Algonquin, KVG	KVG	200	Clyde S.S. Co.	300, **600**	P G	N	0.20	2.00
Algonquin, NRA	NRA	150	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Al-ki	WNK	—	H. C. Strong	—	—	—	—	—
Allianca	KMA	200	Panama Railroad Co.	300, **600**	P G	N	0.20	2.00
Alliance	WRV	—	North Pacific S.S. Co.	—	—	—	—	—
Aloha	KYH	—	Arthur Curtiss James	—	—	—	—	—
Alvina	WEY	—	Thomas F. Cole	—	—	—	—	—
America	KNZ	—	Brooklyn & Manhattan Ferry Co.	—	—	—	—	—
Ammen	NBP	—	Navy	600	O, P R	—	0.20	2.00
Ancon	KMS	200	Panama Railroad Co.	300, **600**	P G	N	0.20	2.00
Androscoggin	NRD	150	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Annapolis	NBR	—	Navy	600	O, P R	—	0.20	2.00
Ann Arbor No. 3	WDN	—	Ann Arbor Railroad Co.	300, 470, **600**	special and P G	X	0.20	2.00
Ann Arbor No. 4	WDO	—	Ann Arbor Railroad Co.	300, **600**	special and P G	X	0.20	2.00
Ann Arbor No. 5	WDP	—	Ann Arbor Railroad Co.	300, **600**	special and P G	X	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Antilles	KKA	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Apache, KVA	KVA	200	Clyde S.S. Co.	300, **600**	P G	N	0.20	2.00
Apache, NRP	NRP	100	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Arapahoe	KVB	200	Clyde S.S. Co.	300, **600**	P G	N	0.20	2.00
Argyll	WTB	—	Union S.S. Co.	—	—	—	—	—
Arizona	WFG	90	Goodrich Transit Co.	300, **600**	P G	N	0.20	2.00
Arkansas	NBV	—	Navy	600	O, P R	—	0.20	2.00
Aroline	WRJ	—	Aroline S.S. Co.	—	—	—	—	—
Ashtabula, WEZ	WEZ	110	Penn. & Ontario Transportation Co.	300, **600**	P G	X	0.20	2.00
Asuncion	WTX	—	Standard Oil Co.	—	—	—	—	—
Atalanta	KYA	—	George J. Gould	—	—	—	—	—
Atlas	WTT	—	Standard Oil Co.	—	—	—	—	—
Aztec	WWQ	—	Pacific Mail S.S. Co.	—	—	—	—	—
Bailey	NCF	—	Navy	600	O, P R	—	0.20	2.00
Baltimore	NCH	—	Navy	600	O, P R	—	0.20	2.00
Bayamon	KDX	—	Ocean Freight Line	—	—	—	—	—
Bay State	KRE	—	Eastern S.S. Corporation	—	—	—	—	—
Beale	NCL	—	Navy	600	O, P R	—	0.20	2.00
Bear	NRB	150	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Bear	WWD	—	San Francisco & Portland S.S. Co.	—	—	—	—	—
Beaver	WWB	—	San Francisco & Portland S.S. Co.	—	—	—	—	—
Belfast	KRD	100	Eastern S.S. Corporation	300, **600**	P G	X	0.20	2.00
Beluga	WLB	—	American Deep Sea Exploration Co.	—	—	—	0.40	4.00
Berkshire	KQB	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Berlin	WRB	—	Alaska-Portland Packers' Association	—	—	—	—	—
Bertha	WBR	—	Alaska Coast Co.	—	—	—	—	—
Birmingham, NCM	NCM	—	Navy	600	O, P R	—	0.20	2.00
Borinquen	KDW	200	Ocean Freight Line	300, **600**	P G	N	0.20	2.00
Boston	KXA	—	New England S.S. Co.	—	—	—	—	—
Brazos	KEZ	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Breakwater	WBK	—	Southern Pacific Co.	—	—	—	—	—
Brilliant	KTI	—	Standard Oil Co.	—	—	—	—	—
Brunswick	KOS	200	Gulf & Southern S.S. Co.	300, **600**	P G	N	0.20	2.00
Brutus	NRA	—	Navy	600	O, P R	—	0.20	2.00
[illegible]	[illegible]	[illegible]	[illegible] Pacific S.S. Co.	[illegible]	[illegible]	—	0.40	2.00

			Wilmington Transportation Co.					
Caesar, NCY	NCY	—	Navy	600	O, P R	—	0.20	2.00
California, NCZ	NCZ	—	Navy	600	O, P R	—	0.20	2.00
Calvin Austin	KRN	—	Eastern S.S. Corporation	—	—	—	—	—
Camden	KRC	100	Eastern S.S. Corporation	300, 600	P G	X	0.20	2.00
Camino	WQC	—	Western Steam Nav. Co.	—	—	—	—	—
Cape Cod	KPW	—	George R. West	—	—	—	—	—
Captain A. F. Lucas	WTV	—	Standard Oil Co.	—	—	—	—	—
Captain Barrett	WYP	35	Army	300	O	—	—	—
Captain Chas. W. Rowell	WYI	35	Army	300	O	—	—	—
Caracas	KDB	200	Red " D " Line	300, 600	P G	N	0.20	2.00
Carlos	WNC	—	Olson & Mahony	—	—	—	—	—
Carolina	KGB	—	New York & Porto Rico S.S. Co.	300, 600	P G	—	0.20	2.00
Carolina	WFE	—	Goodrich Transit Co.	—	—	—	—	—
Carolyn	KNF	—	A. H. Bull S.S. Co.	—	—	—	—	—
Cassandra	KYE	—	George J. Whalen	—	—	—	—	—
Castine	NDA	—	Navy	600	O, P R	—	0.20	2.00
Catania	WTI	—	Coast Oil Transportation Co.	—	—	—	—	—
Celilo	WMF	—	C. R. McCormick & Co.	300, 600	P G	—	0.10	1.00
Celtic, NDB	NDB	—	Navy	600	O, P R	—	0.20	2.00
Centralia	WSN	—	T. Pollard	—	—	—	—	—
Chalmette	KKC	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Charleston	NFE	—	Navy	600	O, P R	—	0.20	2.00
Chattanooga	NGI	—	Navy	600	O, P R	—	0.20	2.00
Chehalis	WSH	—	Sudden & Christenson	—	—	—	—	—
Cherokee	KVK	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Chester	NDG	—	Navy	600	O, P R	—	0.20	2.00
Chester W. Chapin	KXQ	—	New England S.S. Co.	—	—	—	—	—
Cheyenne, NDH	NDH	—	Navy	600	O, P R	—	0.20	2.00
Chicago, NDI	NDI	—	Navy	600	O, P R	—	0.20	2.00
Chicago	WAC	—	Booth Fisheries Co.	—	—	—	—	—
Chicago	WFI	—	Goodrich Transit Co.	—	—	—	—	—
China	WWA	—	Pacific Mail S.S. Co.	—	—	—	—	—
Chippewa	WBH	—	Tacoma-Seattle-Everett Route	—	—	—	—	—
Christopher Columbus	WFJ	—	Goodrich Transit Co.	—	—	—	—	—
Cid (El)	KKT	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Cincinnati, NDL	NDL	—	Navy	600	O, P R	—	0.20	2.00
City of Alpena II.	WEH	—	Detroit & Cleveland Nav. Co.	—	—	—	—	—
City of Annapolis	KSW	—	Chesapeake S.S. Co.	—	—	—	0.20	2.00
City of Atlanta	KFB	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Augusta	KFJ	—	Ocean S.S. Co. (Savannah Line)	—	—	—	—	—
City of Baltimore	KRY	—	Chesapeake S.S. Co.	—	—	—	—	—
City of Bangor	KRH	—	Eastern S.S. Corporation	—	—	—	—	—
City of Benton Harbor	WDV	—	Graham & Morton Transportation Co.	—	—	—	—	—
City of Buffalo	WFQ	—	Cleveland & Buffalo Transportation Co.	300, 600	P G	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
City of Chicago	WDT	—	Graham & Morton Transportation Co.	—	—	—	—	—
City of Cleveland III.	WEA	—	Detroit & Cleveland Nav. Co.	—	—	—	—	—
City of Columbus	KFA	200	Ocean S.S. Co. (Savannah Line)	300, **600**	P G	N	0.20	2.00
City of Detroit II.	WEC	—	Detroit & Cleveland Nav. Co.	300, 420, **600**	P G	—	—	—
City of Detroit III.	WEF	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	—	—	—
City of Erie	WFP	100	Cleveland & Buffalo Transportation Co.	300, **600**	P G	N	0.20	2.00
City of Grand Rapids	WDS	—	Graham & Morton Transportation Co.	—	—	—	—	—
City of Lowell	KXB	—	New England S.S. Co.	—	—	—	—	—
City of Mackinac II.	WEB	—	Detroit & Cleveland Nav. Co.	300, **600**	—	—	—	—
City of Macon	KFC	—	Ocean S.S. Co. (Savannah Line)	—	—	—	—	—
City of Memphis	KFD	—	Ocean S.S. Co. (Savannah Line)	—	—	—	—	—
City of Montgomery	KFY	200	Ocean S.S. Co. (Savannah Line)	300, **600**	P G	N	0.20	2.00
City of Norfolk	KRZ	—	Chesapeake S.S. Co.	—	—	—	—	—
City of Panama	WWP	—	Pacific Mail S.S. Co.	—	—	—	—	—
City of Para	WWF	—	Pacific Mail S.S. Co.	—	—	—	—	—
City of Puebla	WGQ	200	Pacific Coast Co.	300, **600**	P G	N	0.20, 0.40	2.00, 4.00
City of Richmond	KSV	—	Chesapeake S.S. Co.	—	—	—	0.20	2.00
City of Rockland	KRI	—	Eastern S.S. Corporation	—	—	—	—	—
City of St. Ignace	WEG	—	Detroit & Cleveland Nav. Co.	—	—	—	—	—
City of St. Louis	KFX	200	Ocean S.S. Co.	300, **600**	P G	N	0.20	2.00
City of Savannah	KFK	200	Ocean S.S. Co.	300, **600**	P G	N	0.20	2.00
City of Seattle	WGA	—	Pacific Coast S.S. Co.	—	—	—	—	—
City of South Haven	WDI	—	Chicago & South Haven S.S. Co.	—	—	—	—	—
City of Sydney	WWG	—	Pacific Mail SS.. Co.	—	—	—	—	—
City of Taunton	KXL	—	New England S.S. Co.	—	—	—	—	—
City of Topeka	WGY	—	Pacific Coast Co.	—	—	—	—	—
City of Traverse	—	—	Graham & Morton Transportation Co.	—	—	—	0.20	2.00
Cleveland, NDM	NDM	—	Navy	600	O, P R	—	0.20	2.00
Coamo	KGA	200	New York & Porto Rico S.S. Co.	300, **600**	P G	N	0.20	2.00
Col. E. L. Drake	WTS	—	Standard Oil Co.	—	—	—	—	—
Col. James M. [illegible]	[illegible]	[illegible]	Shenango S.S. Co.	300, **600**	P G	N	0.20	2.00
Colon	[illegible]	[illegible]	[illegible] Railroad Co.	[illegible]	[illegible]	[illegible]	[illegible]	2.00

Comal ..								
Comanche	KEM	200	Mallory S.S. Co.	—	—	—	—	—
Comet ..	KVC	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Commonwealth	KTJ	—	Standard Oil Co.	300, 600	P G	N	0.20	2.00
Comus ..	KXC	—	New England S.S. Co.	—	—	—	—	—
Concho ..	KKD	200	Southern Pacific Co.	—	—	—	—	—
Concord	KEC	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Congress	KNC	—	Colonial Nav. Co.	300, 600	P G	N	0.20	2.00
Connecticut	WGT	—	Pacific Coast S.S. Co.	—	—	—	—	—
Connecticut	KXO	—	New England S.S. Co.	—	—	—	—	—
Cordova	NDQ	—	Navy	600	O, P R	—	0.20	2.00
Coronado	WAR	—	Alaska S.S. Co.	—	—	—	—	—
Corsair ..	WSO	—	T. Pollard	—	—	—	—	—
Corwin ..	KYC	—	J. Pierpont Morgan estate	—	—	—	—	—
	WNN	—	Kotzebue Transportation & Trading Co.	—	—	—	—	—
Creole ..	KKR	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Cretan ..	KQC	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Cristobal	KMD	200	Panama Railroad Co.	300, 600	P G	N	0.20	2.00
Crook	WXB	300	Army	600	O	N	—	—
Cuba ..	KPK	—	Merritt & Chapman Derrick & Wrecking Co.	—	—	—	—	—
Culgoa ..	NDU	—	Navy	600	O, P R	—	0.20	2.00
Curacao	WGK	—	Pacific Coast Co.	—	—	—	—	—
Currier ..	KNU	—	Cuba Ditsilling Co.	—	—	—	—	—
C. W. Morse (Tug)	KMO	—	McAllister Bros.	300, 600	P G	—	0.20	2.00
Cyclops, NDY	NDY	—	Navy	600	O. P R	—	0.20	2.00
Cyprus ..	KYD	—	Daniel C. Jackling	—	—	—	—	—
Cyrus W. Field	WXS	130	Army	600	O	—	—	—
Dakotan	WKD	200	American-Hawaiian S.S. Co.	300, 600	P G	N	0.20	2.00
Delaware Sun ..	KTW	—	Sun Co.	—	—	—	—	—
Deleware	NEK	—	Navy	600	O, P R	—	0.20	2.00
Delhi ..	WGD	—	Pacific Coast S.S. Co.	—	—	—	—	—
Denver, KED ..	KED	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Denver, NEM ..	NEM	—	Navy	600	O, P R	—	0.20	2.00
Des Moines	NEN	—	Navy	600	O, P R	—	0.20	2.00
Dia (El)	KKY	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Diamond Head	WNL	—	Tyee Co.	—	—	—	—	—
Dirigo ..	WAO	—	Alaska S.S. Co.	—	—	—	—	—
Dix ..	WXC	300	Army	600	O	N	—	—
Dixie ..	NEP	—	Navy	600	O, P R	—	0.20	2.00
Dolphin..	NEQ	—	Navy	600	O, P R	—	0.20	2.00
Dolphin..	WAU	—	Alaksa S.S. Co.	—	—	—	—	—
Don Juan de Austria ..	NER	—	Navy	—	—	—	—	—
Dora ..	WAH	—	Alaska S.S. Co.	—	—	—	—	—
Dorchester	KQD	150	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Dorothea	NES	—	Navy	—	—	—	—	—
Dorothy Bradford	KNA	—	Cape Cod S.S. Co.	—	—	—	—	—
Drayton	NET	—	Navy	600	O, P R	—	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*cont.*							Francs.	Francs.
Dubuque	NEU	—	Navy	—	—	—	—	—
E-1	NXS	—	Navy	600	O, P R	—	0.20	2.00
E-2	NXT	—	Navy	600	O, P R	—	0.20	2.00
E. G. Crosby	WEL	—	Crosby Transportation Co.	—	—	—	—	—
Eagle	NFC	—	Navy	600	O, P R	—	0.20	2.00
Eastern States	WEE	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	—	—	—
Eastland	WFN	—	Eastland Nav. Co.	—	—	—	—	—
Edgar H. Vance	WQE	—	Nehalem S.S. Co.	—	—	—	—	—
Edith	WAE	—	Alaska S.S. Co.	—	—	—	—	—
Elcano	NFD	—	Navy	600	O, P R	—	0.20	2.00
Elfrida	—	—	Navy	—	—	—	—	—
Elmer A. Keeler	KVU	—	Elmer A. Keeler	—	—	—	—	—
Enterprise	WMN	—	Matson Nav. Co.	—	—	—	—	—
Erskine M. Phelps	WTA	—	William D. Sewall	—	—	—	—	—
Eesperanza	KWZ	200	New York & Cuba Mail S.S. Co.	300, **600**	P G	N	0.20	2.00
Essex	NFJ	—	Navy	—	—	—	—	—
Essex, KQE	KQE	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Evelyn	KNE	—	A. H. Bull S.S. Co.	—	—	—	—	—
Excelsior, KKO	KKO	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Explorer	NLI	100	Navy	300, **600**	O ..	X	—	—
F. A. Kilburn	WRW	—	North Pacific S.S. Co.	—	—	—	—	—
Falcon	WRK	—	Charles Nelson Co.	—	—	—	—	—
Fanning	NFM	—	Navy	600	O, P R	—	0.20	2.00
Favorite	WCF	—	Great Lakes Towing Co.	—	—	—	0.10	1.00
Fifield	WRF	—	Fifield S.S. Co.	—	—	—	—	—
Finland	KSF	—	Red Star Line	—	—	—	—	—
Florence	KYF	—	Alphonse H. Alker	—	—	—	—	—
Florida	KSY	—	Baltimore Steam Packet Co.	—	—	—	—	—
Florida	NFR	—	Navy	600	O, P R	—	0.20	2.00
Flusser	NFS	—	Navy	600	O, P R	—	0.20	2.00
Fort Bragg	WST	—	C. H. Higgins & Co.	—	—	—	—	—
Forward	KPF	—	Yankee Salvage Association	—	—	—	—	—
Francis H. Leggett	WSB	—	Hicks-Hauptman Transportation Co.	—	—	—	—	—
Frieda	[illegible]	100	Union Sulphur Co.	300, **600**	P G	N	0.20	2.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] W. Fenwick	WNG	—	Fenwick S.S. Co.	—	—	—	—	—
Georgia	NGF	—	Navy	—	—	—	—	—
Georgia	WFA	—	Goodrich Transit Co.	600	O, PR	—	0.20	2.00
Georgian	WKG	—	American-Hawaiian S.S. Co.	—	—	—	—	—
Glacier	NGH	—	Navy	—	—	—	—	—
Glory of the Seas	WBZ	—	Alaska Fish Co.	600	O, PR	—	0.20	2.00
Gloucester, KQG	KQG	200	Merchants & Miners Transportation Co.	300, 600	PG	N	0.20	2.00
Gloucester	NGI	—	Navy	—	—	—	—	—
Goldsborough	NGJ	—	Navy	600	O, PR	—	0.20	2.00
Goliah	WPG	—	Puget Sound Tug Boat Co.	—	—	—	—	—
Gopher	NGK	—	Navy	—	—	—	—	—
Governor	WGR	—	Pacific Coast S.S. Co.	—	—	—	—	—
Governor Cobb	KRB	100	Eastern S.S. Corporation	300, 600	PG	N	0.20	2.00
Governor Dingley	KRV	—	Eastern S.S. Corporation	—	—	—	—	—
Grace Dollar	WSF	—	Robt. Dollar Co.	—	—	—	—	—
Grayson	KDV	—	Ocean Freight Line	—	—	—	—	—
Grecian	KQR	200	Merchants & Miners Transportation Co.	300, 600	PG	N	0.20	2.00
Greenwood	WQG	—	Greenwood S.S. Co.	—	—	—	—	—
Gresham	NRG	300	Revenue-Cutter	300, 600, 750	O, PR	N	0.20	2.00
Guardian	WGZ	—	Central & South American Telegraph Co.	—	—	—	—	—
Gulfoil	KTG	—	Gulf Refining Co.	—	—	—	—	—
Hamilton	KOA	200	Old Dominion S.S. Co.	300, 600	PG	N	0.20	2.00
Hanalei	WHN	—	Independent S.S. Co.	—	—	—	—	—
Hannibal, NGU	NGU	—	Navy	600	O, PR	—	0.20	2.00
Harvard	WRH	—	Metropolitan S.S. Co.	—	—	—	—	—
Havana	KWH	200	New York & Cuba Mail S.S. Co.	300, 600	PG	N	0.20	2.00
Hawk	—	—	Navy	—	—	—	—	—
Hector	NGX	—	Navy	600	O, PR	—	0.20	2.00
Helena	—	—	Armour Grain Co.	—	—	—	—	—
Helena	NGY	—	Navy	600	O, PR	—	0.20	2.00
Henley	NHA	—	Navy	600	O, PR	—	0.20	2.00
Henry T. Scott	WRA	—	Eschen & Minor Ltd.	—	—	—	—	—
Herman Frasch	KFH	—	Union Sulphur Co.	—	—	—	—	—
Hermosa	WBP	—	Wilmington Transportation Co.	—	—	—	—	—
Hilonian	WMM	—	Matson Nav. Co.	—	—	—	—	—
Holland	WDW	—	Graham & Morton Transportation Co.	—	—	—	—	—
Honolulan	WKH	—	American-Hawaiian S.S. Co.	—	—	—	—	—
Hopkins	NHC	—	Navy	600	O, PR	—	0.20	2.00
Howard	KQH	200	Merchants & Miners Transportation Co.	300, 600	PG	N	0.20	2.00
Hull	NHE	—	Navy	600	O, PR	—	0.20	2.00
Humboldt	WHX	—	Humboldt S.S. Co.	—	—	—	—	—
Huron	KVH	200	Clyde S.S. Co.	300, 600	PG	N	0.20	2.00
Hyades	WMK	—	Matson Nav. Co.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Idaho, NHN	NHN	—	Navy	**600**	O, P R	—	0.20	2.00
I. D. Fletcher	KFI	—	Coast Transit Co.	—	—	—	—	—
I. J. Merritt	KRQ	—	Merritt & Chapman Derrick & Wrecking Co.	—	—	—	—	—
Illinois	KTH	—	Texas S.S. Co.	—	—	—	—	—
Illinois	NHO	—	Navy	**600**	O, P R	—	0.20	2.00
Illinois	WCZ	—	Northern Michigan Transportation Co.	—	—	—	—	—
Independent	WPI	—	Weding & Independent Fisheries Co.	—	—	—	0.10	1.00
Indian, KQI	KQI	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Indiana, NHQ	NHQ	—	Navy	**600**	O, P R	—	0.20	2.00
Indiana, WFC	WFC	100	Goodrich Transit Co.	300, **600**	P G	N	0.20	2.00
Iowa, NHT	NHT	—	Navy	**600**	O, P R	—	0.20	2.00
Iowa, WFD	WFD	90	Navy	300, **600**	P G	N	0.20	2.00
Iris	NHU	—	Navy	**600**	O, P R	—	0.20	2.00
Iroquois	KVF	—	Clyde S.S. Co.	—	—	—	—	—
Iroquois, NHV	NHV	—	Navy	**600**	O, P R	—	0.20	2.00
Iroquois	WBG	—	International S.S. Co.	—	—	—	—	—
Itasca, NRI	NRI	150	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
J. A. Chanslor	WTK	—	Associated Transportation Co.	—	—	—	—	—
James Fornance	WYM	35	Army	**300**	O	—	—	—
Jamestown	KOC	200	Old Dominion S.S. Co.	300, **600**	P G	N	0.20	2.00
Jarvis	NIB	—	Navy	**600**	O, P R	—	0.20	2.00
J. B. Stetson	WRC	—	Hicks Hauptman Lumber Co.	—	—	—	—	—
Jefferson, KOD	KOD	200	Old Dominion S.S. Co.	300, **600**	P G	N	0.20	2.00
Jefferson, WAJ	WAJ	150	Alaska S.S. Co.	300, **600**	P G	N	0.40	4.00
Jenkins	NID	—	Navy	**600**	O, P R	—	0.20	2.00
J. M. Guffey	KTF	—	Gulf Refining Co.	—	—	—	—	—
John A. Hooper	WSJ	—	Sudden & Christenson	—	—	—	—	—
John D. Archibald	KTK	—	Standard Oil Co. of N.J.	300, **600**	P G	—	0.20	2.00
Joseph Henry	WXT	130	Army	**600**	O	—	—	—
Joseph Pulitzer	WPZ	—	Port of Portland	—	—	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	**600**	O, P R	—	0.20	2.00
[illegible]	[illegible]	[illegible]	[illegible] & Miners Transporta-	[illegible]	P G	N	0.20	[illegible]

[illegible]	NIP	—	Navy	600	O, P R	—	0.20	2.00
Kentucky, NIQ	NIQ	—	Navy	600	O, P R	—	0.20	2.00
Kershaw	KQK	200	Merchants & Miners T. Co.	300, 600	P G	N	0.20	2.00
Kilpatrick	WXD	300	Army	600	O ..	N	—	—
Kingfisher	WPK	—	New England Fish Co.	—	—	—	—	—
Kismet	KYK	—	Raymond Hoagland	—	—	—	—	—
Klamath	WSX	—	Klamath S.S. Co.	—	—	—	—	—
Korea	WWK	—	Pacific Mail S.S. Co.	—	—	—	—	—
Kroonland	KSH	—	Red Star Line	—	—	—	—	—
Kukui	NLF	100	Navy	300, 600	O ..	X	—	—
Kvichak	WNS	—	Alaska Packers' Association	—	—	—	—	—
Lakeland	WDL	—	Port Huron & Duluth S.S. Co.	—	—	—	—	—
Lampasas	KEP	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Lamson	NIW	—	Navy	600	O, P R	—	0.20	2.00
Lansing	WTC	—	Union S.S. Co.	—	—	—	—	—
Larimer	KTA	—	Gulf Refining Co.	—	—	—	—	—
Latouche	WAI	—	Alaska S.S. Co.	—	—	—	—	—
Lawrence	NIY	—	Navy	600	O, P R	—	0.20	2.00
Lebanon	NIZ	—	Navy	600	O, P R	—	0.20	2.00
Leelanaw	WNI	—	Leelanaw S.S. Co.	—	—	—	—	—
Lenape	KVL	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Lewis Luckenbach	WNH	—	Edgar F. Luckenbach	—	—	—	—	—
Lexington	KNB	50	Colonial Nav. Co.	300, 450, 500, 550, 600	P R	N	0.15	1.50
Lexington	KQL	—	Merchants & Miners T. Co.		—	—	—	—
Ligonier	KTD	—	Gulf Refining Co.	—	—	—	—	—
Liscum	WXE	300	Army	600	O ..	N	—	—
Logan	WXF	300	Army	600	O ..	N	—	—
Louise	KRL	—	Tolchester Beach Improvement	—	—	—	—	—
Louisiana	NJB	—	Navy	600	O, P R	—	0.20	2.00
Lurline	WML	—	Matson Nav. Co.	—	—	—	—	—
Lydonia	WDY	—	W. A. Lydon	—	—	—	—	—
Lyra	WNF	—	Edgar F. Luckenbach	—	—	—	—	—
Lysistrata	KYL	—	James Gordon Bennett	—	—	—	—	—
Macdonough	NJH	—	Navy	600	O, P R	—	0.20	2.00
Machias	NJI	—	Navy	—	—	—	—	—
Mackinaw	WHW	—	Schubach-Hamilton S.S. Co.	—	—	—	—	—
Madison	KOG	200	Old Dominion S.S. Co.	300, 600	P G	N	0.20	2.00
Maine	KME	—	C. Clarke & Co.	—	—	—	0.20	2.00
Maine	KXD	—	New England S.S. Co.	—	—	—	—	—
Maine, NJL	NJL	—	Navy	600	O, P R	—	0.20	2.00
Major Thomas	WYO	35	Army	300	O ..	—	—	—
Manchuria	WWE	—	Pacific Mail S.S. Co.	—	—	—	—	—
Manitou	WFW	—	Northern Michigan Transportation Co.	—	—	—	—	—
Manning	NRN	150	Revenue-Cutter	300, 600	O, P R	N	0.20	2.00
Manoa	WMQ	—	Matson Nav. Co.	—	—	—	0.40	4.00
Maracaibo	KDM	200	Red "D" Line	300, 600	P G	N	0.20	2.00
Marblehead	NJO	—	Navy	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Marietta	NIQ	—	Navy	600	O, P R ..	—	0.20	2.00
Mariposa	WHP	—	Alaska S.S. Co.	—	—	—	—	—
Marquette & Bessemer No. 1..	WEW	—	Marquette & Bessemer Dock & Nav. Co.	—	—	—	—	—
Marquette & Bessemer No. 2..	WEX	—	Marquette & Bessemer Dock & Nav. Co.	—	—	—	—	—
Mars, NJR	NJR	—	Navy	600	O, P R ..	—	0.20	2.00
Mary Dodge	WMD	—	Alaska Investment & Developing Co.	—	—	—	—	—
Maryland, NJS	NJS	—	Navy	600	O, P R ..	—	0.20	2.00
Mascotte	KOW	—	Peninsular & Occidental S.S. Co.	—	—	—	—	—
Massachusetts	KJM	—	Eastern S.S. Corporation	—	—	—	—	—
Massachusetts	NIT	—	Navy	600	O, P R ..	—	0.20	2.00
Matsonia	WMP	—	Maston Nav. Co.	—	—	—	0.40	4.00
Maverick	WTW	—	Standard Oil Co.	—	—	—	—	—
Mayflower	NJV	—	Navy	600	O, P R ..	—	0.20	2.00
Mayrant	NJU	—	Navy	600	O, P R ..	—	0.20	2.00
McCall	NJW	—	Navy	600	O, P R ..	—	0.20	2.00
McClellan	WXH	300	Army	600	O	N	—	—
McCulloch	NRH	150	Revenue-Cutter	300, **600**	O, P R ..	N	0.20	2.00
Meade	WXG	300	Army	600	O	N	—	—
Merrimack	KQM	200	Merchants & Miners T. Co. ..	300, **600**	P G ..	N	0.20	2.00
Merritt	WXI	300	Army	600	O	N	—	—
Mexico, KWX	KWX	200	New York & Cuba Mail S.S. Co.	300, **600**	P G ..	N	0.20	2.00
Miami	KOZ	—	Peninsular & Occidental S.S. Co.	—	—	—	—	—
Miami	NRQ	300	Revenue-Cutter	300, **600**, 750	O, P R ..	N	0.20	2.00
Michigan, NJZ	NJZ	—	Navy	600	O, PR ..	—	0.20	2.00
Millinocket	KNM	200	A. H. Bull S.S. Co.	300, **600**	P G ..	—	0.20	2.00
Mills	KRR	—	Ogden Mills	—	—	—	—	—
Minnesota	—	—	Chicago and Duluth Trans. Co. ..	—	—	—	—	—
Minnesota	NKD	—	Navy	600	O, P R ..	—	0.20	2.00
Minnesota	WEK	—	Crosby Transportation Co. ..	—	—	—	—	—
Minnesota	WMI	—	Great Northern S.S. Co.	300, **600**	P G ..	X	0.20	2.00
Minnesotan	WKM	200	American Hawaiian S.S. Co. ..	600	O, P R ..	—	0.20	2.00
Mississippi	[illegible]	—	Navy	[illegible]	O, P R ..	—	[illegible]	2.00
[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	NKJ	—	Navy [illegible]	300, 600	P G	N	0.20	2.00
Monaghan	NKL	—	Navy	600	O, P R	—	0.20	2.00
Mongolia	WWN	—	Pacific Mail S.S. Co.	600	O, P R	—	0.20	2.00
Montana	NKM	—	Navy	—	—	—	—	—
Montanan	WKN	—	American-Hawaiian S.S. Co.	600	O, P R	—	0.20	2.00
Monterey, KWY	KWY	200	New York & Cuba Mail S.S. Co.	—	—	—	—	—
Monterey, NKN	NKN	—	Navy	300, 600	P G	N	0.20	2.00
Montgomery	NKO	—	Navy	600	O, P R	—	0.20	2.00
Morrill	NRC	75	Revenue-Cutter	600	O, P R	—	0.20	2.00
Morra Castle	KWC	200	New York & Cuba Mail S.S. Co.	300	O, P R	N	0.20	2.00
Multnomah	WMA	—	Chas. R. McCormick & Co.	300, 600	P G	N	0.30	2.00
Nacoochee	KFP	—	Ocean S.S. Co. (Savannah Line)	—	—	—	—	—
Nann Smith	WBO	—	Inter-Ocean Transportation Co.	—	—	—	—	—
Nanshan	NNK	—	Navy	—	—	—	—	—
Nantucket	KQN	200	Merchants & Miners Transportation Co.	600	O, P R	—	0.20	2.00
				300, 600	P G	N	0.20	2.00
Nashville	NKY	—	Navy	600	O, P R	—	0.20	2.00
Navajo	NKZ	—	Navy	600	O, P R	—	0.20	2.00
Navajo	WNJ	—	Western Steam Nav. Co.	—	—	—	—	—
Nebraska	NMA	—	Navy	600	O, P R	—	0.20	2.00
Nelson	KNL	250	Cuba Distilling Co.	300, 600	P G	X	0.20	2.00
Neptune, NMS	NMS	—	Navy	600	O, P R	—	0.20	2.00
Nero	NMB	—	Navy	600	P, P R	—	.0.20	2.00
New Hampshire	KXF	—	New England S.S. Co.	—	—	—	—	—
New Hampshire	NME	—	Navy	600	O, P R	—	0.20	2.00
New Haven	KXN	50	New England S.S. Co.	300, 450, 500, 550, 600	P R	N	0.15	1.50
New Jersey	KNJ	—	United New York & Sandy Hook Pilots' Association	300, 600	P G	—	0.20	2.00
New Jersey	NMF	—	Navy	600	O, P R	—	0.20	2.00
New Orleans, NMG	NMG	—	Navy	600	O, P R	—	0.20	2.00
Newport	WWH	—	Pacific Mail S.S. Co.	—	—	—	—	—
New York	KNK	—	United New York & Sandy Hook Pilots' Association	300, 600	P G	—	0.20	2.00
New York	KSN	—	International Mercantile Marine Co. (American Line)	—	—	—	—	—
Niagara	KYN	—	Howard Gould	—	—	—	—	—
Noma	KYO	—	Vincent Astor	—	—	—	—	—
Nome City	WRN	—	Charles Nelson Co.	—	—	—	—	—
Norte (El)	KKN	—	Southern Pacific Co.	—	—	—	—	—
North American	WEN	—	Chicago, Duluth & Georgian Bay Transit Co.	—	—	—	—	—
North Carolina	NMN	—	Navy	600	O, P R	—	0.20	2.00
North Dakota	NMO	—	Navy	600	O, P R	—	0.20	2.00
North Land	KID	200	Eastern S.S. Corporation	300, 600	P G	N	0.20	2.00
North Land	WCN	—	Northern S.S. Co.	—	—	—	—	—
Northland	WNX	—	E. J. Dodge Co.	—	—	—	—	—
North Star	KJS	200	Eastern S.S. Corporation	300, 600	P G	N	0.20	2.00
Northwestern	WAN	250	Alaska S.S. Co.	300, 600	P G	N	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
North Wind (yacht)	KYB	75	Chas. M. Clark	300	P	X	—	—
Norwood	WSG	—	Sudden & Christenson	—	—	—	—	—
Nueces	KEH	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Nushagak	WNE	—	Alaska Packers' Association	—	—	—	—	—
Nyack	WEJ	—	Crosby Transportation Co.	—	—	—	—	—
Occidente (El)	KKX	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Octorara	WCD	—	Erie & Western Transportation Co. (Anchor Line)	—	—	—	—	—
Ohio	NMW	—	Navy	600	O, P R	—	0.20	2.00
Old Colony	KJO	—	Eastern S.S. Corporation	—	—	—	—	—
Oleum	WTD	—	Union Oil Co.	—	—	—	—	—
Oliver J. Olson	WNB	—	Olson & Mahony	—	—	—	—	—
Olivette	KOV	—	Peninsular & Occidental S.S. Co.	—	—	—	—	—
Oneida (yacht)	KYP	—	E. C. Benedict	300, 550, **600**	P	X	—	—
Oneonta	WPX	—	Port of Portland	—	—	—	—	—
Onondaga	NRO	300	Revenue-Cutter	300, **600**, 750	O, P R	N	0.20	2.00
Ontario, NTA	NTA	—	Navy	600	O, P R	—	0.20	2.00
Ontario KQO	KQO	200	Merchants & Miners T. Co.	300, **600**	P G	N	0.20	2.00
Oregon	NMZ	—	Navy	600	O, P R	—	0.20	2.00
Oriente (El)	KKV	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Orion, NOC	NOC	—	Navy	600	O, P R	—	0.20	2.00
Osceola	NOA	—	Navy	600	O, P R	—	0.20	2.00
Ozark	—	—	Navy	—	—	—	—	—
P. R. R. 707	KPR	—	Pennsylvania Railroad Co.	—	—	—	—	—
Paducah	NOG	—	Navy	600	O, P R	—	0.20	2.00
Pamlico	NRR	50	Revenue Cutter	300	O, P R	N	0.20	2.00
Panama, KMH	KMH	200	Panama Railroad Co.	300, **600**	P G	N	0.20	2.00
Pan American	KUT	—	Texas S.S. Co.	—	—	—	—	—
Panther, NOJ	NOJ	—	Navy	600	O, P R	—	0.20	2.00
Paraguay	KTT	—	Sun Co.	—	—	—	—	—
Parthian	KQP	200	Merchants & Miners T. Co.	300, **600**	P G	N	0.20	2.00
Patapsco	NOL	—	Navy	600	O, P R	—	0.20	2.00
Patterson, NLH	NLH	100	Navy	300, **600**	O	X	—	—
Patterson, NOK	NOK		Navy	600	O, P R		0.20	2.00
[illegible]	NOM		Navy	600	O, P R		[illegible]	2.00

Pere Marquette 20	WDB	—	Pere Marquette Railroad Co.	300, 600	P R	X	0.20	2.00
Perfection	KTN	—	Standard Oil Co.	—	—	—	—	—
Perkins	NOX	—	Navy	—	—	—	—	—
Perry	NOY	—	Navy	600	O, P R	—	0.20	2.00
Persian	KQX	—	Merchants & Miners Transportation Co.	600	O, P R	—	0.20	2.00
Peru	WWJ	—	Pacific Mail S.S. Co.	—	—	—	—	—
Petrel	NOZ	—	Navy	—	—	—	—	—
Pettibone	KUP	—	Guyton & Co.	600	O, P R	—	0.20	2.00
Philadelphia	KDA	200	Red "D" Line	—	—	—	—	—
Philadelphia	KSM	—	International Mercantile Marine Co. (American Line)	300, 600	P G	N	0.20	2.00
				300, 600	P G	—	—	—
Pilgrim	KXG	—	New England S.S. Co.	—	—	—	—	—
Pilotboy	KPL	—	Texas & Gulf S.S. Co.	—	—	—	—	—
Pioneer	WPN	—	Puget Sound Tug Boat Co.	300, 600	P G	—	0.20	2.00
Pittsburgh	NOT	—	Navy	600	O, P R	—	0.20	2.00
Pleiades	WNP	—	Pleiades Inc.	—	—	—	—	—
Plymouth	KXH	50	New England S.S. Co.	300, 450, 500, 550, 600	P R	N	0.15	0.50
Pompey	NQF	—	Navy	600	O, P R	—	0.20	2.00
Ponce	KGP	200	New York & Porto Rico S.S. Co.	300, 600	P G	N	0.20	2.00
Portland	WNV	—	Lotus S.S. Co.	—	—	—	—	—
Potomac, NQK	NQK	—	Navy	600	O, P R	—	0.20	2.00
Powhatan, KQY	KQY	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	200
Prairie	NQM	—	Navy	600	O, P R	—	0.20	2.00
Preble	NQN	—	Navy	600	O, P R	—	0.20	2.00
President	WGP	—	Pacific Coast S.S. Co.	—	—	—	—	—
Preston	NQO	—	Navy	600	O, P R	—	0.20	2.00
Princesse Anne	KOB	200	Old Dominion S.S. Co.	300, 600	P G	N	0.20	2.00
Princeton	NQP	—	Navy	600	O, P R	—	0.20	2.00
Priscilla	KXI	—	New England S.S. Co.	—	—	—	—	—
Prometheus, NQR	NQR	—	Navy	600	O, P R	—	0.20	2.00
Proteus	KKP	200	Southern Pacific Co.	300, 600	P;G	N	0.20	2.00
Providence	KXJ	50	New England S.S. Co.	300, 450, 500, 550, 600	P R	N	0.15	1.50
Puritan	KXK	—	New England S.S. C.o	—	—	—	—	—
Puritan	WDU	—	Graham & Morton Trans.	300, 600	P G	—	—	—
Quantico	KQQ	200	Merchants & Miners Trans.	300, 600	P G	N	0.20	2.00
Queen	WGX	—	Pacific Coast S.S. Co.	—	—	—	—	—
Radiant	KTR	—	Standard Oil Co.	—	—	—	—	—
Rainbow, NTD	NTD	—	Navy	600	O, P R	—	0.20	2.00
Raleigh	NTE	—	Navy	600	O, P R	—	0.20	2.00
Ransom B. Fuller	KRF	—	Eastern S.S. Corporation	—	—	—	—	—
Rayo	KTL	—	Standard Oil Co.	—	—	—	—	—
Redondo	WBM	—	Inter-Ocean Transportation Co.	—	—	—	—	—
Reid	NTU	—	Navy	600	O, P R	—	0.20	2.00
Relay	KVZ	—	Mexican Telegraph Co.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs
Relief	KRJ	—	Merritt & Chapman Derrick & Wrecking Co.	—	—	—	—	—
Reno	WYN	35	Army	300	O	—	—	—
Rescue	KRP	—	Merritt & Chapman Derrick & Wrecking Co.	—	—	—	—	—
Reuce	WSR	—	Columbia River Packers' Assn.	—	—	—	—	—
Rhode Island	NTX	—	Navy	600	O, P R	—	0.20	2.00
Richard Peck	KXR	—	New England S.S. Co.	—	—	—	—	—
Richmond	WTR	—	Standard Oil Co.	—	—	—	—	—
Rio (El)	KKZ	200	Southern Pacific Co.	300, 525, **600**	P G	N	0.20	2.00
Rio Grande, KEG	KEG	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Riverside	WRM	—	Charles Nelson Co.	—	—	—	—	—
Roanoke	WRR	—	North Pacific S.S. Co.	—	—	—	—	—
Rochelle	WNR	—	E. H. Dodge	—	—	—	—	—
Roe	NTZ	—	Navy	600	O, P R	—	0.20	2.00
Roma	WTE	—	Union S.S. Co.	—	—	—	—	—
Rose City	WWR	—	San Francisco & Portland S.S. Co.	—	—	—	—	—
Sabine	KEB	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
S. Louis, NTF	NTF	—	Navy	600	O, P R	—	0.20	2.00
S. Marcos	KEK	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
S. O. Co. No. 91	WTU	—	Standard Oil Co.	—	—	—	—	—
S. O. Co. No. 92	KTY	—	Standard Oil Co.	—	—	—	—	—
S. O. Co. No. 93	WTY	—	Standard Oil Co.	—	—	—	—	—
S. O. Co. No. 94	KTP	—	Standard Oil Co.	—	—	—	—	—
S. O. Co. No. 95	WTZ	—	Standard Oil Co.	—	—	—	—	—
St. Francis	WHH	—	Alaska Fisherman's Packing Co.	—	—	—	—	—
St. Helens	WNY	—	E. J. Dodge Co.	—	—	—	—	—
St. Louis	KSL	—	American Line	—	—	—	—	—
St. Nicholas	WSS	—	Columbia Rivers Packers' Association	—	—	—	—	—
St. Paul	KSO	—	International Mercantile Marine Co. (American Line)	—	—	—	—	—
Salem	NTP	—	Navy	600	O, P R	—	0.20	2.00
San Francisco	[illegible]	[illegible]	[illegible]	600	O, P R	—	0.20	2.00
[illegible]	[illegible]	200	[illegible]	300, **600**	P G	N	0.20	2.00
[illegible]	[illegible]	[illegible]	[illegible] S.S. Co.	[illegible]	P G	N	0.20	2.00

Santa Catalina	WBC	—	W. R. Grace & Co.	—	—	—	—	—
Santa Clara	WRS	200	North Pacific S.S. Co.	300, 600	P G ..	N	0.20	2.00
Santa Clara	WBA	—	W. R. Grace & Co. — ..	300, 600	P G ..	—	0.20	2.00
Santa Cruz	WPA	—	Puget Sound Salvage Co... ..	—	—	—	0.20	2.00
Santa Cruz	WBD	—	W. R. Grace & Co.	—	—	—	—	—
Santa Maria	WTF	—	United S.S. Co.	—	—	—	—	—
Santa Rita	WTG	—	United S.S. Co.	—	—	—	—	—
Santa Rosa	WGN	—	Pacific Coast Co.	—	—	—	—	—
Saratoga, KWS	KWS	200	New York & Cuba Mail S.S. Co...	300, 600	P G ..	N	0.20	2.00
Saratoga, NTR	NTR	—	Navy	600	O, P R ..	—	0.20	2.00
Savage	KRS	—	Consolidation Coal Co.	—	—	—	—	—
Scorpion, NTT..	NTT	—	Navy	600	O, P R ..	—	0.20	2.00
Sea Otter	KYS	—	Hugh L. Willoughby	—	—	—	—	—
Seeandbee	WFS	—	Cleveland & Buffalo Transportation Co.	300, 600	P G ..	—	—	—
Seguranca	KWG	200	New York & Cuba Mail S.S. Co...	300, 600	P G ..	N	0.20	2.00
Seminole, KVJ	KVJ	200	Clyde S.S. Co.	300, 600	P G ..	N	0.20	2.00
Seminole, NRS	NRS	150	Revenue-Cutter	300, 600	O, P R ..	N	0.20	2.00
Senator	WGS	—	Pacific Coast S.S. Co.	—	—	—	—	—
Senator Bailey	KGS	—	Steele Towing & Wrecking Co. ..	—	—	—	—	—
Seneca	NRE	300	Revenue-Cutter	300, 600, 750	O, P R ..	N	0.20	2.00
Seward	WAV	—	Alaska S.S. Co.	—	—	—	—	—
Shenango	KTC	—	Gulf Refining Co.	—	—	—	—	—
Shenango	WET	—	Shenango S.S. Co.	—	—	—	—	—
Sheridan	WXJ	300	Army	600	O	N	—	—
Sherman	WXK	300	Army	600	O	N	—	—
Segundo El	KTK	—	Standard Oil Co.	—	—	—	—	—
Sheboygan	WFL	—	Goodrich Transit Co.	—	—	—	0.20	2.00
Siberia	WWU	—	Pacific Mail S.S. Co.	—	—	—	—	—
Sierra	WHJ	—	Oceanic S.S. Co.	—	—	—	—	—
Smith	NSQ	—	Navy	600	O, P R ..	—	0.20	2.00
Snohomish	NRF	75	Revenue-Cutter	300	O, P R ..	N	0.20	2.00
Socony	KTX	—	Standard Oil Co.	—	—	—	—	—
Sol (El)	KKB	200	Southern Pacific Co.	300, 600	P G ..	N	0.20	2.00
Solace	NST	—	Navy	600	O, P R ..	—	0.20	2.00
Somerset, KQS	KQS	200	Merchants & Miners Transportation Co.	300, 600	P G ..	N	0.20	2.00
Sonoma	NTG	—	Navy	600	O, P R ..	—	0.20	2.00
Sonoma	WHM	—	Oceanic S.S. Co.	—	—	—	—	—
South American	WEO	—	Chicago Duluch & Georgian Bay S.S. Co.	300, 600	P G ..	—	0.10	1.00
South Carolina..	NSW	—	Navy	600	O, P R ..	—	0.20	2.00
South Dakota	NSX	—	Navy	600	O, P R ..	—	0.20	2.00
Speedwell	WQS	—	Southern Oregon Transportation Co.	—	—	—	—	—
Spokane	WGE	—	Pacific Coast S.S. Co.	—	—	—	—	—
Stanley Dollar	WSD	—	Robt. Dollar Co.	—	—	—	—	—
Starr	WPS	—	San Juan Fishing & Packing Co...	—	—	—	—	—
State of California	WGL	200	Pacific Coast S.S. Co.	300, 600	P G ..	N	0.20, 0.40	2.00 4.00
State of Ohio	WFR	—	Cleveland & Buffalo Transportation Co.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs
Sterrett	NTB	—	Navy	600	O, P R	—	0.20	2.00
Stewart	NTC	—	Navy	600	O, P R	—	0.20	2.00
Stranger	—	—	Navy	—	—	—	—	—
Stringham	NTI	—	Navy	600	O, P R	—	0.20	2.00
Sud (El)	KKQ	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Sumner	WXL	300	Army	600	O	N	—	—
Sun	KTU	—	Sun Co.	—	—	—	—	—
Supply	NTK	—	Navy	600	O, P R	—	0.20	2.00
Suwannee	KQZ	200	State Steel Trust Co.	300, **600**	P G	N	0.20	2.00
Sylph	NTL	—	Navy	600	O, P R	—	0.20	2.00
Tacoma	NUA	—	Navy	600	O, P R	—	0.20	2.00
Tahoma	NRK	150	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Tallahassee	NUC	—	Navy	600	O, P R	—	0.20	2.00
Tarragon	NZZ	—	Government	**300**	O	—	—	—
Tasco	KFT	50	T. A. Scott Co.	300, 400, 480, **600**	P	X	—	—
Tatoosh	WPE	—	Puget Sound Tug Boat Co.	—	—	—	—	—
Tennessee	NUG	—	Navy	600	O, P R	—	0.20	2.00
Terry	NUI	—	Navy	600	O, P R	—	0.20	2.00
The Limit	WFT	—	Whiting Bros.	—	—	—	—	—
Theodore Roosevelt	WCT	—	Indiana Transportation Co.	—	—	—	—	—
Thetis, NRT	NRT	150	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Thomas	WXM	300	Army	600	O	N	—	—
Tionesta	WCA	—	Erie & Western Transportation Co. (Anchor Line)	—	—	—	—	—
Toledo	KTV	—	Sun Co.	—	—	—	—	—
Tonopah	NUN	—	Navy	600	O, P R	—	0.20	2.00
Topila	KKE	—	Southern Pacific Co.	—	—	—	—	—
Trippe	NU G	—	Navy	600	O, P R	—	0.20	2.00
Truxton	NUS	—	Navy	600	O, P R	—	0.20	2.00
Tuscan	KOT	200	Merchants & Miners Trans. Co.	300, **600**	P G	X	0.20	2.00
Tuscarora	NRL	100	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Tyee	WPC	—	Puger Sound Tug Boat Co.	—	—	—	—	—
Tyee Junior	WPB	—	Tyee Co.	—	—	—	—	—
Umatilla	WGU	—	Pacific Coast S.S. Co.	—	—	—	—	—
Unalga	NRX	300	Revenue-Cutter	300, **600**, 800	O, P R	N	0.20	2.00
Utah	[illegible]	[illegible]	Navy	600	O, P R	—	0.20	2.00
[illegible]	[illegible]	[illegible]	[illegible] Co.	300, **600**	P G	N	[illegible]	2.00

Ventura	WHL	—	Oceanic S.S. Co.	—	—	—	—	—
Vermont	NVK	—	Navy	600	O, P R	—	0.20	2.00
Vesta	KTS	—	Standard Oil Co.	—	—	—	—	—
Vesuvius	NVM	—	Navy	600	O, P R	—	0.20	2.00
Vicksburg	NVN	—	Navy	600	O, P R	—	0.20	2.00
Victoria	WAD	—	Alaska S.S. Co.	—	—	—	—	—
Vigilancia	KWV	200	New York & Cuba Mail S.S. Co.	300, **600**	P G	N	0.20	2.00
Viillalobos	NVP	—	Navy	600	O, P R	—	0.20	2.00
Vrginia	KSZ	—	Baltimore Steam Packet Co.	—	—	—	—	—
Virginia	NVR	—	Navy	600	O, P R	—	0.20	2.00
Virginia	WFH	—	Goodrich Transit Co.	—	—	—	—	—
Vixen	NVS	—	Navy	—	—	—	—	—
Vulcan, NVT	NVT	—	Navy	600	O, P R	—	0.20	2.00
W. B. Flint	WHG	—	Astoria Savings Bank	—	—	—	—	—
W. B. Keene (Tug)	KWK	—	Hilton Dodge Transport Co.	300, **600**	P G	—	0.20	2.00
Wakiva	KYI	—	Lamon V. Harkness	—	—	—	—	—
Walke	NWL	—	Navy	600	O, P R	—	0.20	2.00
Wallula	WPY	—	Port of Portland	—	—	—	—	—
Wana	KYX	—	George C. Sherman	—	—	—	—	—
Warren	WXN	300	Army	600	O	N	—	—
Warrington	NWD	—	Navy	600	O, P R	—	0.20	2.00
Warrior	KYW	—	Frederick William Vanderbilt	—	—	—	—	—
Washington	NWE	—	Navy	600	O, P R	—	0.20	2.00
Washtenaw	WTH	—	Union S.S. Co.	—	—	—	—	—
Watson	WAW	—	Alaska-Pacific S.S. Co.	—	—	—	—	—
Western States	WED	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	—	—	—
West Virginia	NWG	—	Navy	600	O, P R	—	0.20	2.00
Wheeling	NWH	—	Navy	600	O, P R	—	0.20	2.00
Whipple	NWI	—	Navy	600	O, P R	—	0.20	2.00
Whittier	WHT	—	Union Transportation Co.	—	—	—	—	—
Wild Duck	KYG	—	Gulf Refining Co.	—	—	—	0.20	2.00
Wilhelmina	WMO	—	Matson Nav. Co.	—	—	—	—	—
Willamette	WSW	—	C. R. McCormick & Co.	—	—	—	—	—
William Chatham	WMC	—	William Chatham Co., Inc.	—	—	—	—	—
William P. Snyder	WER	—	Shenango S.S. Co.	—	—	—	—	—
William P. Snyder, Junr.	WES	—	Shenango S.S. Co.	—	—	—	—	—
Wilmington	NWK	—	Navy	600	O, P R	—	0.20	2.00
Wilpen	WEU	—	Shenango S.S. Co.	—	—	—	—	—
Windber	WND	—	Pacific-American Fisheries	—	—	—	—	—
Windom	NRW	100	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Winifred	KTE	—	Gulf Refining Co.	—	—	—	—	—
Winona	NRV	75	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Wisconsin	NWM	—	Navy	600	O, P R	—	0.20	2.00
Wm. B. Davock	—	—	Vulcan S.S. Co.	—	—	—	—	—
Wm. F. Herrin	WTN	—	Associated Transportation Co.	—	—	—	—	—
Woodbury	NRJ	75	Revenue-Cutter	300, **600**	O, P R	N	0.20	2.00
Wolverine	NWN	—	Navy	—	—	—	—	—
W. S. Porter	WTM	—	Associated Transportation Co.	—	—	—	—	—
Wyoming	NWQ	—	Navy	600	O, P R	—	0.20	2.00
Yaguez	KDY	200	Ocean Freight Line	300, **600**	P G	N	0.20	2.00
Yale	WRY	—	Metropolitan S.S. Co.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Yamacraw	NRY	150	Revenue-Cutter	300, **600**	O, P R ..	N	0.20	2.00
Yantic	NXC	—	Navy	—	—	—	—	—
Yosemite	WQY	—	Yosemite S.S. Co.	—	—	—	—	—
Yucatan	WMY	—	North Pacific S.S. Co.	—	—	—	—	—
Yukon	WBQ	—	Alaska Coast Co.	—	—	—	—	—
Zapora	WPQ	—	International Fisheries Co. ..	—	—	—	—	—
Zealandia	KNR	—	C. L. Dimon	—	—	—	—	—
Zulia	KDZ	200	Red "D" Line	300, **600**	P G ..	N	0.20	2.00

NOTES

Ship Stations

1. The station is operated and controlled bv the Government; it belongs to the Imperial Inspectorate of the radiotelegraph service, Trieste.

2. During the voyage between Trieste and North America, or vice versâ.

3. During the voyage between Trieste and South America, or vice versâ.

4. Yacht belonging to M. E. Jellinek-Mercédès. The station is operated and controlled by the owner of the yacht.

5. For pleasure courses.

6. Trieste-Alexandria Line.

7. Trieste-India, Eastern Asia Line.

8. Trieste-North and South America Line.

9. Trieste-Bombay Line.

10. Public correspondence is admitted on the service of the crews of the war vessels belonging to Austria-Hungary. Private radiotelegrams must be drawn up in plain language. No ship charge is made.

11. Operated and controlled by the Société Anonyme Internationale de Télégraphie sans fil, Brussels.

12. Belgian Government steamer on the service between Ostend and Dover. The station is operated and controlled by the Belgian Government.

13. Correspondence restricted to Nieuport, North Foreland, and the steamers of the same line.

14. During the crossings, which take place three times a day in each direction. Time of crossing, about three hours. Departures: from Ostend at about 10.45 a.m., 3.30 p.m., and 11 p.m.; from Dover at about 11 a.m., 4.30 p.m., and 11 p.m.

15. In the case of radiotelegrams exchanged either between the steamers and Nieuport or between two steamers, no special ship charge. The total wireless charge is fixed at fr. 1.50 per radiotelegram of ten words or less, with fr. 0.10 additional for each word over ten. For correspondence with North Foreland, the ship charge is fr. 0.10 per word, with a minimum of fr. 1.00 per radiotelegram.

16. Operated and controlled by the Ministry of Naval Service, Ottawa.

17. Operated and controlled by the Marconi Wireless Telegraph Company of Canada, Ltd., Montreal.

18. Operated and controlled by the Ministry of Marine and Fisheries, Ottawa.

19. From 8 a.m. to 8 p.m., continuous service; from 8 p.m. to 8 a.m., as required.

20. Lighthouse inspection ship. The station is operated and controlled by the Ministry of Marine.

21. Buoy inspection ship. The station is operated and controlled by the Ministry of Marine.

22. Public correspondence may be admitted, without ship charge, if there is no naval correspondence. Private radiotelegrams must be drawn up in plain language.

23. No ship charge.

24. Cable ship belonging to the Government of the Dutch East-Indies.

25. Operated and controlled by the Compagnie Française Maritime et Coloniale de Télégraphie sans Fil, Paris.

26. Ship engaged in a regular service between France on the one hand, and Corsica, Algeria, and Tunis on the other.

27. Engaged in a regular service between France and Corsica.

28. Ship engaged in a regular service between France and Algeria.

29. Ship engaged in a regular service between France, Algeria, and Tunis.

30. Ship engaged in a regular service between Calais and Dover.

31. Operated and controlled by the Deutsche Betriebsgesellschaft für drahtlose Telegraphie, Berlin.

32. In the case of radiotelegrams exchanged with British coast stations, the coast charge is fr. 0.30 per word with a minimum of fr. 1.80 per radiotelegram. In the case of radiotelegrams intended for the United Kingdom, a charge of fr. 0.35 per word, with a minimum of fr. 2.10 per radiotelegram, is made for the coast charge and the charge for transmission over the telegraph lines.

33. For radiotelegrams liable to charge.

34. Official correspondence with Sassnitz and Trälleborg, and also with the other ferry-boats of the Sassnitz-Trälleborg line, concerning the railway traffic.

35. Public correspondence with Sassnitz and Trälleborg, and also with the other ferry-boats of the Sassnitz-Trälleborg line.

36. The service of the Sassnitz-Trälleborg line being performed alternately by German and Swedish ferry-boats, it is necessary to replace the name of the ship station in the address of radiotelegrams by one of the following indications :—

Ferry-boat A for the boat leaving Sassnitz in the morning;
Ferry-boat C for the boat leaving Sassnitz in the afternoon;
Ferry-boat B for the boat leaving Trälleborg in the morning;
Ferry-boat D for the boat leaving Trälleborg in the afternoon.

37. The ship charge for radiotelegrams intended for the ferry-boats is, without regard to the nationality of the boats, fr. 0.18 per word, with a minimum of fr. 1.80, when the radiotelegrams are transmitted

via Sassnitz; and fr. 0.14 per word, with a minimum of fr. 1.40, when they are transmitted via Trälleborg.

38. Special correspondence, relating to the service of the ship.

39. During the time of the voyage between New York and the West Indies.

40. Monday, 7 a.m. to 1 p.m.; Tuesday, 12 a.m. to 8.30 p.m.; Wednesday, 2 p.m. to 6 p.m.; Thursday, 12 a.m. to 8.30 p.m.; Friday, 7 p.m. to 10 p.m.; Saturday, 12 a.m. to 8.30 p.m.; Sunday, 7 a.m. to 1 p.m., 2 p.m. to 8.30 p.m.

41. 8 a.m. to 12 p.m., continuous service; 12 p.m. to 8 a.m., besides the first ten minutes, during the last fifteen minutes of each hour.

42. 6 a.m. to 12 p.m., continuous service; 12 p.m. to 6 a.m., only during the first ten minutes of each hour.

43. Operated and controlled by the owner; the accounts are settled by the Deutsche Betriebsgesellschaft für drahtlose Telegraphie, Berlin.

44. Operated and controlled by the Marconi International Marine Communication Company, London.

45. The wave-length ordinarily employed is 450 metres.

45A. In the case of radiotelegrams exchanged with coast stations of the United Kingdom, the coast charge is fr. 0.30 per word, with a minimum of fr. 1.80 per radiotelegram.

46. The wave-length ordinarily employed is 400 metres.

47. Correspondence limited to Caister-on-Sea, North Foreland, and Scheveningen Port.

48. Communicates only with Seaforth (Liverpool).

49. The ship charge is reduced to fr. 0.15 per word with a minimum of fr. 0.90 per radiotelegram when the ship is engaged on voyages between the United Kingdom and ports distant less than 1,000 nautical miles (1,855 km.) from the United Kingdom.

50. In the case of radiotelegrams exchanged with coast stations of the United Kingdom, the coast charge is fr. 0.15 per word with a minimum of fr. 1.50 per radiotelegram. In the case of radiotelegrams exchanged with French coast stations, the coast charge is fr. 0.15 per word without a minimum.

51. The period during which the station is open cannot exceed 10 hours per day.

52. For the first ten words, fr. 4.00. For each additional word, fr. 0.20.

53. Ice observation ship in the North Atlantic Ocean.

54. Operated and controlled by the Marconi Wireless Telegraph Company of America, on behalf of the Marconi International Marine Communication Company, London.

55. The ship charge is reduced to fr. 0.10 per word with a minimum of fr. 1.00 when the ship travels between Victoria, Vancouver, and Seattle.

56. Performing the day service; from Flushing 11 a.m., from Queenborough 11.30 a.m.

57. Performing the night service; from Flushing 12 p.m., from Folkestone 10.30 p.m.

58. Additional wave of 500 metres for communication with Scheveningen Port.

59. Public correspondence restricted to radiotelegrams exchanged by the steamers of the Zeeland Company, between themselves and with the Scheveningen Port and North Foreland coast stations.

60. Public correspondence restricted to radiotelegrams exchanged by this steamer either with the Scheveningen Port and North Foreland coast stations, or with the other steamers of the Batavier-Lijn. When, however, on special occasions the ship departs from the normal route the station conducts general public correspondence.

61. Public correspondence may be admitted, without ship charge, if there is no official correspondence.

62. In the case of radiotelegrams transmitted through Scheveningen Port or exchanged with the other stations of the Zeeland Company, the total radiotelegraph charge is fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram. In the case of radiotelegrams exchanged through North Foreland, the ship charge is fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram, and the coast charge is fr. 0.15 per word with a minimum of fr. 1.50 per radiotelegram. For radiotelegrams intended for the United Kingdom, however, a charge is made, in addition to the ship charge of fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram, representing the coast charge of North Foreland, and the inland wire charge.

63. In the case of radiotelegrams transmitted through North Foreland, the coast charge is fr. 0.15 per word with a minimum of fr. 1.50 per radiotelegram. For radiotelegrams intended for the United Kingdom, however, a charge is made, in addition to the ship charge, of fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram, representing the coast charge of North Foreland and the inland wire charge.

64. This call-signal is allotted to all torpedo-boats of the Royal Navy; when necessary, it is followed by the number of the torpedo-boat.

65. This call-signal is allotted to all the submarines of the Royal Navy; when necessary, it is followed by the number of the submarine.

66. Operated and controlled by Compagnia Internazionale Marconi per le Comunicazioni Marittime, Rome.

67. Public correspondence with Constantza-Tunnel only.

68. No special ship charge. The ship charge applicable to correspondence originating at or intended for Roumanian ships is included in the coast charge of Constantza-Tunnel.

69. The ship charge is reduced to fr. 0.13 per word for correspondence with Russian coast and ship stations.

70. Also, in case of urgency, at any time of the day or night.

71. The station is open during the first and last fifteen minutes of each hour from 8 a.m. to 10 p.m.

72. 3 a.m., 4 a.m., 6 a.m., 7 a.m., 9 a.m., 10 a.m., 11 a.m., 12 a.m., 6 p.m., 7 p.m., 8 p.m., 9 p.m., 10 p.m., 12 p.m.

73. The wave length of 450 metres is employed for communication with Trälleborg, Sassnitz, and the ferry-boats of the Trälleborg-Sassnitz line.

74. Public correspondence with Trälleborg, Sassnitz, and the other ferry-boats of the Trälleborg-Sassnitz line.

75. Official correspondence with Trälleborg, Sassnitz, and the other ferry-boats of the Trälleborg-Sassnitz line, concerning the railway traffic.

76. The ship charge, without regard to the nationality of the boats, is fr. 0.14 per word with a minimum of fr. 1.40 per radiotelegram for correspondence exchanged with Trälleborg, and fr. 0.18 per word with a minimum of fr. 1.80 per radiotelegram for correspondence exchanged with Sassnitz.

77. During the months October to March.

78. During the months April to September.

79. The service of the Trälleborg-Sassnitz line being performed alternately by German and Swedish ferry-boats, it is necessary to replace the name of the ship station in the address of radiotelegrams by one of the following indications:—

Ferry-boat A for the boat leaving Sassnitz in the morning;
Ferry-boat C for the boat leaving Sassnitz in the afternoon;
Ferry-boat B for the boat leaving Trälleborg in the morning;
Ferry-boat D for the boat leaving Trälleborg in the afternoon.

CALL LETTERS

(*Alphabetically arranged*)

ALLOTTED TO LAND AND SHIP STATIONS.

(*w.s.=warship; s.s.=steamship; s.y.=steam yacht; others=land stations*)

AAD	w.s. Prinz Adalbert
AAE	w.s. Aegir
AAI	w.s. Ariadne
AAK	w.s. Albatross
AAL	w.s. König Albert
AAM	w.s. Amazone
AAR	w.s. Arcona
AAX	w.s. Augsburg
ABD	w.s. Brandenburg
ABE	w.s. Berlin
ABG	w.s. Braunschweig
ABI	w.s. Fürst Bismarck
ABL	w.s. Blücher
ABN	w.s. Bremen
ABW	w.s. Beowulf
ABX	w.s. Breslau
ABZ	w.s. Blitz
ACM	w.s. Cormoran
ACN	w.s. Rondor
ACO	w.s. Cöln
ACR	w.s. Carmen
ADA	w.s. Drache
ADC	w.s. Delphin
ADD	w.s. Andrada
ADE	w.s. Deutschland
ADR	w.s. Dresden
ADZ	w.s. Danzig
AEB	w.s. Eber
AEL	w.s. Elsass
AEM	w.s. Emden
AFO	w.s. Frauenlob
AFR	w.s. Freya
AFS	w.s. Friedrich Carl
AFT	w.s. Frithjof
AFU	w.s. Friedrich der Grosse
AFV	w.s. Fuchs
AGF	w.s. Gefion
AGI	w.s. Geier
AGL	w.s. Gazelle
AGN	w.s. Gneisenau
AGO	w.s. Goeben
AGS	w s. Grille
AHA	w.s. Hagen
AHC	w.s. Helgoland
AHD	w.s. Heimdall
AHE	w.s. Hessen
AHI	w.s. Hildebrand
AHL	w.s. Hela
AHM	w.s. Hamburg
AHN	w.s. Hansa
AHP	w.s. Hay
AHQ	w.s. Hohenzollern
AHR	w.s. Prinz Heinrich
AHT	w.s. Hertha
AHV	w.s. Hannover
AIA	w.s. Jade
AIG	w.s. Jaguar
AIL	w.s. Iltis
AIR	w.s. Irene
AKA	w.s. Kaiserin Augusta
AKB	w.s. Kaiser Barbarossa
AKF	w.s. Kaiser Friedrich III.
AKG	w.s. Kaiser Karl der Grosse
AKI	w.s. Kaiser Wilhelm II.
AKN	w.s. Kolberg
AKO	w.s. Königsberg
AKS	w.s. Kaiser
AKT	w.s. Kaiserin
AKU	w.s. Karlsruhe
AKV	w.s. Kraft
AKW	w.s. Kaiser Wilhelm der Grosse
ALE	w.s. Leipzig
ALG	w.s. Alagoas
ALK	w.s. Lübeck
ALO	w.s. Lothringen
ALP	w.s. Prinzregent Luitpold
ALU	w.s. Luchs
AMB	w.s. Magdeburg
AMC	w.s. Mainz
AMD	w.s. Medusa
AME	w.s. Mecklenburg
AMO	w.s. Amozonas
AMT	w.s. Moltke
AMU	w.s. München
AMW	w.s. Möwe
ANA	w.s. Nassau
ANI	w.s. Niobe
ANL	w.s. Nautilas
ANR	w.s. Norder
ANU	w.s. Nürnberg
ANY	w.s. Nymphe
AOD	w.s. Odin
AOF	w.s. Ostfriesland
AOL	w.s. Oldenburg
AOT	w.s. Otter
APA	w.s. Panther
APE	w.s. Pelikan
APF	w.s. Pfeil
APL	w.s. Planet
APM	w.s. Pommern
APO	w.s. Posen
APR	w.s. Preussen
ARK	w.s. Rostock
ARL	w.s. Rheinland
ARO	w.s. Roon
ARU	w.s. Rüstringen
ASA	w.s. Schwaben
ASB	w.s. Scharnhorst
ASE	w.s. Seeadler
ASI	w.s. Siegfried
ASK	w.s. Strassburg
ASL	w.s. Sleipner
ASM	w s Stralsund
ASN	w.s. Schlesien

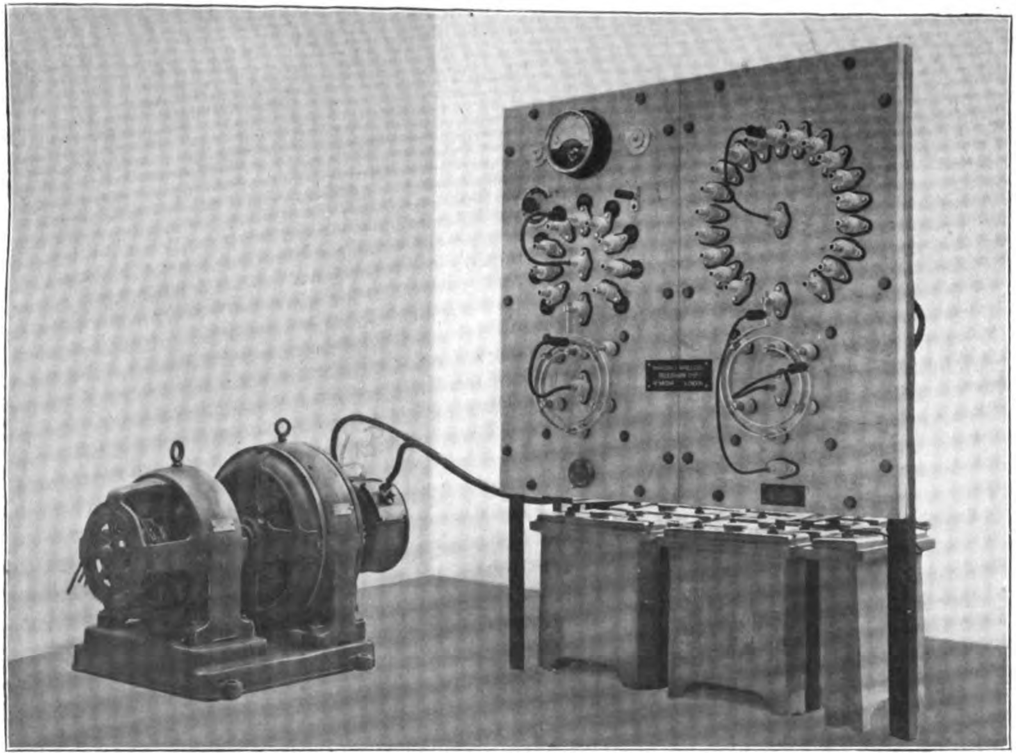
AST	*w.s.* Seydlitz
ASX	*w.s.* Schleswig-Holstein
ASY	*w.s.* Stettin
ASZ	*w.s.* Stuttgart
ATG	*w.s.* Titania
ATH	*w.s.* Thetis
ATI	*w.s.* Tiger
ATK	*w.s.* Taku
ATN	*w.s.* Von der Tann
ATU	*w.s.* Thüringen
ATV	*w.s.* Tsingtau
AUN	*w.s.* Undine
AVL	*w.s.* Victoria Luise
AVN	*w.s.* Vineta
AVT	*w.s.* Vaterland
AVU	*w.s.* Vulkan
AWA	*w.s.* Westfalen
AWE	*w.s.* Wettin
AWI	*w.s.* Wittelsbach
AWL	*w.s.* Prinzess Wilhelm
AWO	*w.s.* Wörth
AWU	*w.s.* Württemberg
AYO	*w.s.* Yorck
AZA	*w.s.* Zähringen
AZI	*w.s.* Zieten
BAA	*w.s.* Africa
BAB	*w.s.* Agamemnon
BAC	*w.s.* Ajax
BAD	*w.s.* Albemarle
BAE	*w.s.* Albion
BAF	*w.s.* Audacious
BAG	*w.s.* Bellerophon
BAH	*w.s.* Benbow
BAI	*w.s.* Britannia
BAJ	*w.s.* Bulwark
BAK	*w.s.* Cæsar
BAL	*w.s.* Canopus
BAM	*w.s.* Centurion
BAN	*w.s.* Collingwood
BAO	*w.s.* Colossus
BAP	*w.s.* Commonwealth
BAQ	*w.s.* Conqueror
BAR	*w.s.* Cornwallis
BAS	*w.s.* Dlehi
BAT	*w.s.* Dominion
BAU	*w.s.* Dreadnought
BAV	*w.s.* Duncan
BAW	*w.s.* Empress of India
BAX	*w.s.* Exmouth
BAY	*w.s.* Formidable
BAZ	*w.s.* Glory
BBA	*w.s.* Goliath
BBC	*w.s.* Hannibal
BBD	*w.s.* Hercules
BBE	*w.s.* Hibernia
BBF	*w.s.* Hindustan
BBG	*w.s.* Illustrious
BBH	*w.s.* Implacable
BBI	*w.s.* Iron Duke
BBJ	*w.s.* Irresistible
BBK	*w.s.* Jupiter
BBL	*w.s.* King Edward VII.
BBM	*w.s.* King George V.
BBN	*w.s.* London
BBO	*w.s.* Lord Nelson
BBP	*w.s.* Magnificent
BBQ	*w.s.* Majestic
BBR	*w.s.* Marlborough
BBS	*w.s.* Mars
BBT	*w.s.* Mohawk
BBU	*w.s.* Neptune
BBV	*w.s.* Ocean
BBW	*w.s.* Orion
BBX	*w.s.* Prince George
BBY	*w.s.* Prince of Wales
BBZ	*w.s.* Queen
BCA	*w.s.* Revenge
BCB	*w.s.* Royal Oak
BCC	*w.s.* Benajmin Constant
BCC	*w.s.* Russell
BCD	*w.s.* St. Vincent
BCE	*w.s.* Superb
BCF	*w.s.* Swiftsure
BCG	*w.s.* Temeraire
BCH	*w.s.* Thunderer
BCI	*w.s.* Triumph
BCJ	*w.s.* Vanguard
BCK	*w.s.* Venerable
BCL	*w.s.* Vengeance
BCM	*w.s.* Victorious
BCN	*w.s.* Zealandia
BCO	*w.s.* Indefatigable
BCP	*w.s.* Indomitable
BCQ	*w.s.* Inflexible
BCR	*w.s.* Invincible
BCS	*w.s.* Lion
BCT	*w.s.* New Zealand
BCU	*w.s.* Princess Royal
BCV	*w.s.* Queen Mary
BCW	*w.s.* Tiger
BCX	*w.s.* Aboukir
BCY	*w.s.* Achilles
BCZ	*w.s.* Antrim
BDA	*w.s.* Argyll
BDB	*w.s.* Bacchante
BDC	*w.s.* Berwick
BDD	*w.s.* Black Prince
BDE	*w.s.* Carnarvon
BDF	*w.s.* Cochrane
BDG	*w.s.* Cornwall
BDH	*w.s.* Cressy
BDI	*w.s.* Cumberland
BDJ	*w.s.* Defence
BDK	*w.s.* Devonshire
BDL	*w.s.* Donegal
BDM	*w.s.* Drake
BDN	*w.s.* Duke of Edinburgh
BDO	*w.s.* Essex
BDP	*w.s.* Euryalas
BDQ	*w.s.* Good Hope
BDR	*w.s.* Hampshire
BDS	*w.s.* Hogue
BDT	*w.s.* Kent
BDU	*w.s.* King Alfred
BDV	*w.s.* Lancaster
BDW	*w.s.* Leviathan
BDX	*w.s.* Minotaur
BDY	*w.s.* Monmouth
BDZ	*w.s.* Natal
BEA	*w.s.* Roxburgh
BEB	*w.s.* Shannon
BEC	*w.s.* Suffolk
BED	*w.s.* Sutledge
BEE	*w.s.* Warrior
BEF	*w.s.* Amphitrite
BEG	*w.s.* Andromeda

BEH	*w.s.* Argonaut
BEI	*w.s.* Ariadne
BEJ	*w.s.* Crescent
BEK	*w.s.* Diadem
BEL	*w.s.* Edgar
BEM	*w.s.* Endymion
BEN	*w.s.* Europa
BEO	*w.s.* Gibraltar
BEP	*w.s.* Grafton
BEQ	*w.s.* Hawke
BER	*w.s.* Royal Arthur
BES	*w.s.* Spartiate
BET	*w.s.* Terrible
BEU	*w.s.* Theseus
BEV	*w.s.* Aeolus
BEW	*w.s.* Arrogant
BEX	*w.s.* Astraea
BEY	*w.s.* Birmingham
BEZ	*w.s.* Brilliant
BFA	*w.s.* Bristol
BFB	*w.s.* Cambrian
BFC	*w.s.* Challenger
BFD	*w.s.* Charybdis
BFE	*w.s.* Chatham
BFF	*w.s.* Dartmouth
BFG	*w.s.* Diana
BFH	*w.s.* Dido
BFI	*w.s.* Doris
BFJ	*w.s.* Dublin
BFK	*w.s.* Eclipse
BFL	*w.s.* Encounter
BFM	*w.s.* Falmouth
BFN	*w.s.* Flora
BFO	*w.s.* Forte
BFP	*w.s.* Fox
BFQ	*w.s.* Glasgow
BFR	*w.s.* Gloucester
BFS	*w.s.* Hermes
BFT	*w.s.* Hermoine
BFU	*w.s.* Highflyer
BFV	*w.s.* Hyacinth
BFW	*w.s.* Isis
BFX	*w.s.* Juno
BFY	*w.s.* Liverpool
BFZ	*w.s.* Lowestoft
BGA	*w.s.* Melpomene
BGB	*w.s.* Minerva
BGC	*w.s.* Newcastle
BGD	*w.s.* Nottingham
BGE	*w.s.* Sappho
BGF	*w.s.* Scylla
BGG	*w.s.* Sirius
BGH	*w.s.* Southampton
BGI	*w.s.* Talbot
BGJ	*w.s.* Venus
BGK	*w.s.* Vindictive
BGL	*w.s.* Weymouth
BGM	*w.s.* Yarmouth
BGN	*w.s.* Amethyst
BGO	*w.s.* Barham
BGP	*w.s.* Diadem
BGQ	*w.s.* Medea
BGR	*w.s.* Pandora
BGS	*w.s.* Pegasus
BGT	*w.s.* Pelorus
BGU	*w.s.* Perseus
BGV	*w.s.* Philomel
BGW	*w.s.* Pioneer

BGX	*w.s.* Prometheus
BGY	*w.s.* Proserpine
BGZ	*w.s.* Psyche
BHA	*w.s.* Pyramus
BHB	*w.s.* Sapphire
BHC	*w.s.* Topaze
BHD	*w.s.* Active
BHE	*w.s.* Amphio
BHF	*w.s.* Bellona
BHG	*w.s.* Blanche
BHH	*w.s.* Blonde
BHI	*w.s.* Bahia
BHI	*w.s.* Boadicea
BHJ	*w.s.* Falmouth
BHK	*w.s.* Adventure
BHL	*w.s.* Attentive
BHM	*w.s.* Foresight
BHN	*w.s.* Forward
BHO	*w.s.* Pathfinder
BHP	*w.s.* Patrol
BHQ	*w.s.* Sentinel
BHR	*w.s.* Skirmisher
BHS	*w.s.* Acasta
BHT	*w.s.* Achates
BHU	*w.s.* Acheron
BHV	*w.s.* Acorn
BHW	*w.s.* Afridi
BHX	*w.s.* Alarm
BHY	*w.s.* Amazon
BHZ	*w.s.* Ambuscade
BIA	*w.s.* Arab
BIB	*w.s.* Archer
BIC	*w.s.* Ardent
BID	*w.s.* Ariel
BIE	*w.s.* Arun
BIF	*w.s.* Attack
BIG	*w.s.* Avon
BIH	*w.s.* Badger
BII	*w.s.* Basilisk
BIJ	*w.s.* Beagle
BIK	*w.s.* Beaver
BIL	*w.s.* Bittern
BIM	*w.s.* Boyne
BIN	*w.s.* Brisk
BIO	*w.s.* Bulldog
BIP	*w.s.* Chameleon
BIQ	*w.s.* Cheerful
BIR	*w.s.* Chelmer
BIS	*w.s.* Cherwell
BIT	*w.s.* Christopher
BIU	*w.s.* Cockatrice
BIV	*w.s.* Colne
BIW	*w.s.* Comet
BIX	*w.s.* Contest
BIY	*w.s.* Cossack
BIZ	*w.s.* Crusader
BJA	*w.s.* Daring
BJB	*w.s.* Dee
BJC	*w.s.* Defender
BJD	*w.s.* Derwent
BJE	*w.s.* Doon
BJF	*w.s.* Dragon
BJG	*w.s.* Druid
BJH	*w.s.* Eden
BJI	*w.s.* Erne
BJJ	*w.s.* Ettrick
BJK	*w.s.* Exe
BJL	*w.s.* Ferret

BJM	*w.s.* Firedrake	BMC	*w.s.* Renard
BJN	*w.s.* Florizel	BMD	*w.s.* Ribble
BJO	*w.s.* Forester	BME	*w.s.* Rifleman
BJP	*w.s.* Fortune	BMF	*w.s.* Rob Roy
BJQ	*w.s.* Foxhound	BMG	*w.s.* Rocket
BJR	*w.s.* Foyle	BMH	*w.s.* Rosalind
BJS	*w.s.* Fury	BMI	*w.s.* Rother
BJT	*w.s.* Garland	BMJ	*w.s.* Ruby
BJU	*w.s.* Garry	BMK	*w.s.* Sandfly
BJV	*w.s.* Ghurka	BML	*w.s.* Saracen
BJW	*w.s.* Goldfinch	BMM	*w.s.* Sarpedon
BJX	*w.s.* Goshawk	BMN	*w.s.* Savage
BJY	*w.s.* Grasshopper	BMO	*w.s.* Scorpion
BJZ	*w.s.* Greyhound	BMP	*w.s.* Scourge
BKA	*w.s.* Hardy	BMQ	*w.s.* Sharp
BKB	*w.s.* Harpy	BMR	*w.s.* Sheldrake
BKC	*w.s.* Haughty	BMS	*w.s.* Sparrowhawk
BKD	*w.s.* Havock	BMT	*w.s.* Spitfire
BKE	*w.s.* Hereward	BMU	*w.s.* Staunch
BKF	*w.s.* Hind	BMV	*w.s.* Stour
BKG	*w.s.* Hope	BMW	*w.s.* Swale
BKH	*w.s.* Hornet	BMX	*w.s.* Swift
BKI	*w.s.* Hotspur	BMY	*w.s.* Sylvia
BKJ	*w.s.* Hydra	BMZ	*w.s.* Talisman
BKK	*w.s.* Itchen	BNA	*w.s.* Tartar
BKL	*w.s.* Ivanhoe	BNB	*w.s.* Test
BKM	*w.s.* Jackal	BNC	*w.s.* Teviot
BKN	*w.s.* Jed	BND	*w.s.* Tigress
BKO	*w.s.* Kale	BNE	*w.s.* Ulysses
BKP	*w.s.* Kennet	BNF	*w.s.* Unity
BKQ	*w.s.* Lapwing	BNG	*w.s.* Ure
BKR	*w.s.* Larne	BNH	*w.s.* Usk
BKS	*w.s.* Liffey	BNI	*w.s.* Velox
BKT	*w.s.* Lizard	BNJ	*w.s.* Victor
BKU	*w.s.* Lurcher	BNK	*w.s.* Vigilant
BKV	*w.s.* Lynx	BNL	*w.s.* Viking
BKW	*w.s.* Lyra	BNM	*w.s.* Viola
BKX	*w.s.* Maori	BNN	*w.s.* Violet
BKY	*w.s.* Martin	BNO	*w.s.* Waveney
BKZ	*w.s.* Mermaid	BNP	*w.s.* Waverley
BLA	*w.s.* Midge	BNQ	*w.s.* Wear
BLB	*w.s.* Minstrel	BNR	*w.s.* Welland
BLC	*w.s.* Mohawk	BNS	*w.s.* Wolverine
BLD	*w.s.* Mosquito	BNT	*w.s.* Zulu
BLE	*w.s.* Moy	BNU	Torpedo Boat No. 2
BLF	*w.s.* Nautilus	BNV	" " " 4
BLG	*w.s.* Nemesis	BNW	" " " 5
BLH	*w.s.* Nereide	BNX	" " " 14
BLI	*w.s.* Ness	BNY	" " " 15
BLJ	*w.s.* Nith	BNZ	" " " 25
BLK	*w.s.* Nubian	BOA	" " " 28
BLL	*w.s.* Nymphe	BOB	" " " 29
BLM	*w.s.* Oak	BOC	" " " 30
BLN	*w.s.* Orlando	BOD	" " " 31
BLO	*w.s.* Ouse	BOE	" " " 32
BLP	*w.s.* Owl	BOF	" " " 33
BLQ	*w.s.* Panther	BOG	" " " 34
BLR	*w.s.* Paragon	BOH	" " " 35
BLS	*w.s.* Phœnix	BOI	" " " 36
BLT	*w.s.* Picton	BOK	Submarine B5
BLU	*w.s.* Pincher	BOM	*w.s.* Assistance
BLV	*w.s.* Porpoise	BON	*w.s.* Cyclops
BLW	*w.s.* Portia	BOP	*w.s.* Actæon
BLX	*w.s.* Racehorse	BOQ	*w.s.* Defiance
BLY	*w.s.* Raccoon	BOR	*w.s.* Vernon
BLZ	*w.s.* Rattlesnake	BOS	*w.s.* Hecla
BMA	*w.s.* Redgauntlet	BOT	*w.s.* Leander
BMB	*w.s.* Redpole	BOU	*w.s.* St. George

BOV	*w.s.* Woolwich	BYM	Culver Cliff
BOW	*w.s.* Hazard	BYN	Portland Bill
BOX	*w.s.* Hebe	BYO	Rame Head
BOY	*w.s.* Maidstone	BYP	Scilly Islands
BOZ	*w.s.* Pactolus	BYQ	Corkbeg
BPA	*w.s.* Sharpshooter	BYR	Bunbeg
BPB	*w.s.* Vulcan	BYS	Portpatrick
BPC	*w.s.* Blake	BYT	Stockton
BPD	*w.s.* Blenheim	BYU	Lerwick
BPE	*w.s.* Bonaventure	BYV	Grimsby
BPF	*w.s.* Forth	BYW	Gibraltar (North Front)
BPG	*w.s.* Intrepid	BYX	Gibraltar (Windmill Hill)
BPH	*w.s.* Naiad	BYY	Malta (S. Angelo)
BPI	*w.s.* Sphinx	BYZ	Malta (Rinella Bay)
BPJ	*w.s.* Thames	BZA	Tamar (Hong-Kong)
BPK	*w.s.* Thetis	BZB	Bermuda
BPL	*w.s.* Endeavour	BZC	Portsmouth (Signal School)
BPM	*w.s.* Watchful	BZT	Farnboro'
BPN	*w.s.* Adamant	BZU	Eastchurch
BPO	*w.s.* Alecto	BZV	Cromarty
BPP	*w.s.* Antelope	BZW	Harwich
BPQ	*w.s.* Bramle	BZX	Yarmouth
BPR	*w.s.* Britomart	BZY	Isle of Grain
BPS	*w.s.* Halcyon	BZZ	Calshot
BPT	*w.s.* Hussar	CAA	*s.s.* Aysen
BPU	*w.s.* Jason	CAH	*s.s.* Huasco
BPV	*w.s.* Leda	CAI	*s.s.* Imperial
BPW	*w.s.* Niger	CAL	*s.s.* Limari
BPX	*w.s.* Skipjack	CAP	*s.s.* Palena
BPY	*w.s.* Spanker	CBA	*w.s.* Chacabuco
BPZ	*w.s.* Thistle	CBB	*w.s.* Blanco
BQA	*w.s.* Alert	CBC	*w.s.* Cochrane
BQB	*w.s.* Cadmus	CBD	*w.s.* Condell
BQC	*w.s.* Clio	CBE	*w.s.* Esmeralda
BQD	*w.s.* Espiegle	CBF	*w.s.* Talcahuano
BQE	*w.s.* Odin	CBG	*s. s.* Gamero
BQF	*w.s.* Torch	CBG	*w.s.* Gamero
BQG	*w.s.* Enchantress	CBH	*w.s.* O'Higgins
BQH	H.M.Y. Victoria & Albert	CBI	*w.s.* Errazuriz
BQI	*w.s.* Alacrity	CBJ	*w.s.* Jarpa
BQJ	*w.s.* Surprise	CBK	*w.s.* Casma
BQK	*w.s.* Maine	CBL	*w.s.* Latorre
BQL	*w.s.* Burmah	CBM	*w.s.* Tomé
BQM	*w.s.* Petroleum	CBN	*w.s.* Obrien
BQN	*w.s.* Mercedes	CBO	*w.s.* Orella
BQO	*w.s.* Olympia	CBP	*w.s.* Prat
BQP	*w.s.* Trefoil	CBQ	*w.s.* Baquedano
BQQ	*w.s.* Andromache	CBR	*w.s.* Riquelme
BQR	*w.s.* Apollo	CBS	*w.s.* Serrano
BQS	*w.s.* Aquarius	CBT	*w.s.* Thompson
BQT	*w.s.* Iphigenia	CBU	*w.s.* Maipo
BQU	*w.s.* Latona	CBW	*w.s.* Rancagua
BQV	*w.s.* Rosario	CBX	*w.s.* ex-Cochrane
BQW	*w.s.* Tyne	CBY	*w.s.* Lynch
BRS	*w.s.* Barroso	CBZ	*w.s.* Zenteno
BTL	Butt of Lewis	CCA	Arica
BYA	Whitehall (London)	CCB	Antofogasta
BYB	Cleethorpes	CCH	Huafo
BYC	Horsea	CCJ	Juan Fernandez
BYD	Aberdeen	CCL	Llanquihue
BYE	Ipswich	CCM	Mocha
BYF	Pembroke	CCN	Escuela (Valparaiso)
BYG	Wick	CCP	Punta Arenas
BYH	Rosyth	CCQ	Coquimbo
BYI	Scarborough	CCR	Cape Raper
BYJ	Felixstowe	CCT	Talcahuano
BYK	Sheerness	CCV	Valparaiso
BYL	Dover	CCZ	Evangelistas



5 k.w. Wireless Transmitting Set (Switchboard Type).

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CGB	*w.s.* Carlos Gomes
CNF	Rabat
CNP	Casablanca
CNW	Tanger
CNY	Mogador
CQA	*s.y.* Hirondelle
CRA	San Miguel
CRB	Santa Maria
CRC	Faial
CRD	Flores
CRE	Corvo
CRF	Lisbon
CSA	*s.s.* Africa
CSB	*s.s.* Beira
CSC	*s.s.* Caxengo
CSF	*s.s.* Funchal
CSG	*s.s.* Guine
CSL	*s.s.* Loanda
CSM	*s.s.* Mocambique
CSN	*s.s.* Malange
CSO	*s.s.* Bolamo
CSP	*s.s.* Portugal
CSS	*s.s.* St. Miguel
CSY	*s.s.* Ambaca
CSZ	*s.s.* Zaire
CTA	*w.s.* Almirante Reis
CTB	*w.s.* Vasco da Gama
CTC	*w.s.* Adamastor
CTD	*w.s.* St. Gabriel
CTG	Colombia
CVC	*g.s.* Règele Carol I.
CVD	*g.s.* Dacia
CVF	*g.s.* Imparatul Traian
CVM	*g.s.* Principesa Maria
CVR	*g.s.* Romania
CVS	Constantza-Tunnel
DAB	*s.s.* Albingia
DAC	*s.s.* Asuncion
DAD	*s.s.* Adler
DAE	*s.s.* Adelaide
DAH	*s.s.* Adeline-Hugo Stinnes III.
DAI	*s.s.* Annie-Hugo Stinnes VI.
DAJ	*s.s.* Alda
DAK	Albany
DAL	*s.s.* Admiral
DAM	*s.s.* Allemannia
DAN	*s.s.* Antonina
DAO	*s.s.* Adolf
DAP	*s.s.* Aachen
DAQ	*s.s.* Alrich
DAR	*s.s.* O. I. D. Ahlers
DAS	*s.s.* Asgard
DAT	*s.s.* Atto
DAU	*s.s.* Australia
DAV	*s.s.* Silvana
DAW	*s.s.* Adolf Woermann
DAX	*s.s.* Axenfels
DAY	*s.s.* Adamsturm
DAZ	*s.s.* Argenfels
DBA	*s.s.* Barcelona
DBB	*s.s.* Bahia Blanca
DBC	*s.s.* Braunfels
DBD	*s.s.* Berthold
DBE	*s.s.* Berengar
DBF	*s.s.* Birkenfels
DBG	*s.s.* Brandenburg
DBH	*s.s.* Bärenfels
DBI	*s.s.* Brisbane
DBJ	*s.s.* Bohemia
DBK	*s.s.* Bahia Castillo
DBL	*s.s.* Bahia Laura
DBM	*s.s.* Bürgermeister
DBO	*s.s.* Friesenberg
DBP	*s.s.* Bahia
DBQ	*s.s.* Brisgavia
DBR	*s.s.* Bremen
DBS	*s.s.* Buenos Aires
DBU	*s.s.* Breslau
DBV	*s.s.* Bavaria
DBW	*s.s.* Bülow
DBX	*s.s.* Badenia
DBY	*s.s.* Belgia
DBZ	*s.s.* Bosnia
DCA	*s.s.* Cap Arcona
DCB	*s.s.* Cap Blanco
DCC	*s.s.* Cassel
DCD	*s.s.* Cobra
DCE	Cap Verde
DCG	*s.s.* Coburg
DCH	*s.s.* Drachtenfels
DCI	*s.s.* Kronprinzessin Cecilie
DCK	*s.s.* Cordoba
DCL	*s.s.* Clara Blumenfeld
DCN	*s.s.* Cap Finisterre
DCO	*s.s.* Cap Ortegal
DCP	*s.s.* Cap Trafalgar
DCR	*s.s.* Cap Roca
DCS	*s.s.* Claire-Hugo Stinnes I.
DCT	*s.s.* Crefeld
DCV	*s.s.* Cap Vilano
DCX	*s.s.* Christian X.
DCZ	*s.s.* Chemnitz
DDA	*s.s.* Kaiserin Auguste Victoria
DDB	*s.s.* Blücher
DDC	*s.s.* Cincinnati
DDD	*s.s.* Sonnenberg
DDE	*s.s.* Deutschland
DDF	*s s.* Pisa
DDG	*s.s.* Bulgaria
DDH	*s.s.* Hamburg
DDI	*s.s.* President Lincoln
DDK	*s.s.* König Wilhelm II.
DDL	*s.s.* Victoria Luise
DDM	*s.s.* Moltke
DDN	*s.s.* Pennsylvania
DDO	*s.s.* Prinz Oskar
DDP	*s.s.* Patricia
DDQ	*s.s.* Pallanza
DDR	*s.s.* Amerika
DDS	*s.s.* President Grant
DDT	*s.s.* Pretoria
DDU	*s.s.* Deutschland
DDV	*s.s.* Cleveland
DDW	*s.s.* Graf Waldersee
DDX	*s.s.* Dania
DDY	*s.s.* Dorothea Rickmers
DDZ	*s.s.* Prinz Adalbert
DEA	*s.s.* Essen
DEB	*s.s.* Elkab
DEC	*s.s.* Elsass
DED	*s.s.* Edward
DEE	*s.s.* Esseingen
DEG	*s.s.* Ebernberg
DEH	*s.s.* Edmund-Hugo Stinnes IV.
DEI	*s.s.* Eisenach
DEL	*s.s.* Belgravia

DEN	*s.s.* Erlangen
DEO	*s.s.* Excelsior
DEP	*s.s.* Persepolis
DER	*s.s.* Derfflinger
DES	*s.s.* Ernst-Hugo Stinnes
DEV	*s.s.* Deutschland
DEV	*s.s.* Ehrenfels
DEW	*s.s.* Eleonore Woermann
DEX	*s.s.* Ellen Rickmers
DEY	*s.s.* Bubendy
DFA	*s.s.* Fangturn
DFB	*s.s.* Fürst Bismarck
DFD	*s.s.* Frankenwald
DFE	*s.s.* Fremantle
DFF	*s.s.* Buffalo
DFH	*s.s.* Fritz-Hugo Stinnes V.
DFL	*s.s.* Feldmarschall
DFR	*s.s.* König Friedrich August
DFS	*s.s.* Freienfels
DFT	*s.s.* Frankfurt
DGA	*s.s.* Ganelon
DGB	*s.s.* Gutenfels
DGD	*s.s.* Steigerwald
DGF	*s.s.* Goldenfels
DGH	*s.s.* Grete-Hugo Stinnes VIII.
DGI	*s.s.* Giessen
DGJ	*s.s.* Gouverneur Jaeschke
DGL	*s.s.* General
DGN	*s.s.* Goeben
DGO	*s.s.* Grossherzog von Oldenburg
DGR	*s.s.* Grunewald
DGS	*s.s.* Sikiang
DGT	*s.s.* Gotha
DGU	*s.s.* Gneisenau
DGW	*s.s.* Gertrud Woermann
DHA	*s.s.* Haimon
DHB	*s.s.* Helene Blumenfeld
DHC	*s.s.* Hathor
DHD	*s.s.* Hubertfels
DHE	*s.s.* Helican
DHG	*s.s.* Habsburg
DHH	*s.s.* Heinrich-Hugo Stinnes VII.
DHI	*s.s.* Hilde-Hugo Stinnes X.
DHJ	*s.s.* Hagen
DHK	*s.s.* Hera
DHL	*s.s.* Holstein
DHM	*s.s.* Hohenfels
DHN	*s.s.* Hohenstaufen
DHP	*s.s.* Harport
DHR	*s.s.* Holger
DHS	*s.s.* Helios
DHT	*s.s.* Hobart
DHU	*s.s.* Helene-Hugo Stinnes XIV.
DHV	*s.s.* Hannover
DHW	*s.s.* Henry Woermann
DHX	*s.s.* Hesperus
DHZ	*s.s.* Herzogin Cecilie
DIA	*s.s.* Rhenania
DIB	*s.s.* Sabine Rickmers
DID	*s.s.* Irmingard
DIK	*s.s.* Deike Rickmers
DIM	*s.s.* Imkenturm
DIO	*s.s.* Entrerios
DIP	*s.s.* Serapis
DIR	*s.s.* Imperator
DIT	*s.s.* Imperator
DJC	*s.s.* San Nicolas
DJN	*s.s.* Sirius
DJV	*s.s.* Java
DKA	*s.s.* Kronprinzessin Cecilie
DKB	*s.s.* Berlin
DKC	*s.s.* Koln
DKD	*s.s.* Friedrich der Grosse
DKE	*s.s.* Prinzess Irene
DKF	*s.s.* Prinz Friedrich Wilhelm
DKG	*s.s.* Grosser Kurfürst
DKI	*s.s.* Main
DKJ	*s.s.* Konig
DKK	*s.s.* Neckar
DKL	*s.s.* Königen Luise
DKM	*s.s.* Kaiser Wilhelm II.
DKN	*s.s.* George Washington
DKO	*s.s.* König Albert
DKP	*s.s.* Kronprinz Wilhelm
DKQ	*s.s.* Kaiser
DKR	*s.s.* Rhein
DKS	*s.s.* Barbarossa
DKT	*s.s.* Komet
DKU	*s.s.* Kandelfels
DKW	*s.s.* Kaiser Wilhelm der Grosse
DKX	*s.s.* Kiowa
DKY	*s.s.* Kybfels
DKZ	*s.s.* Princess Alice
DLA	*s.s.* Lauterfels
DLB	*s.s.* Liebenfels
DLE	*s.s.* Lensahn
DLG	*s.s.* Stolberg
DLI	*s.s.* Lindenfels
DLK	*s.s.* Loki
DLL	*s.s.* Königin Luise
DLM	*s.s.* Goetz
DLN	*s.s.* Loongmoon
DLO	*s.s.* Lützow
DLP	*s.s.* Plata (La)
DLQ	*s.s.* Löwenburg
DLS	*s.s.* Lichtenfels
DLU	*s.s.* Lüneburg
DLW	*s.s.* Lucie Woermann
DLY	*s.s.* Lily Rickmers
DMA	*s.s.* Tucuman
DMB	*s.s.* Ambria
DMC	*s.s.* Madeleine Rickmers
DMD	*s.s.* Mark
DME	*s.s.* Melbourne
DMI	*s.s.* Mohican
DMK	*s.s.* Mohawk
DMM	*s.s.* Mannheim
DMN	*s.s.* Menes
DMO	*s.s.* Moltkefels
DMP	*s.s.* Memphis
DMQ	*s.s.* Mecklenburg
DMR	*s.s.* Meteor
DMS	*s.s.* Marienfels
DMT	*s.s.* Mai Rickmers
DMV	*s.s.* Sudmark
DMW	*s.s.* Möwe
DMX	*s.s.* Mera
DMY	*s.s.* Aenne Rickmers
DNA	*s.s.* Negada
DND	*s.s.* Andree Rickmers
DNE	*s.s.* Sierra Nevada
DNH	*s.s.* Nora-Hugo Stinnes II.
DNI	*s.s.* Nitokris
DNJ	*s s.* Najade
DNK	*s.s.* Karnak
DNL	*s.s.* S. Elena

DNM	s.s. S. Maria
DNN	s.s. S. Fé
DNO	s.s. Normannia
DNR	s.s. S. Rita
DNS	s.s. Neidenfels
DNU	s.s. Neuenfels
DNV	s.s. Navarra
DNX	s.s. Nixe
DNY	s.s. Baden
DNZ	s.s. S. Cruz
DOA	s.s. Camarones
DOC	s.s. Ockenfels
DOD	s.s. Sierra Cordoba
DOG	s.s. Osage
DOH	s.s. Otto-Hugo Stinnes IX.
DOL	s.s. Colmar
DOM	s.s. Bochum
DON	s.s. Adorna
DOP	s.s. Prometheus
DOR	s.s. Kommodore
DOS	s.s. Dora-Hugo Stinnes XII.
DOT	s.s. Crostafels
DOU	s.s. Solfels
DOW	s.s. Wachtfels
DOZ	s.s. Spitzfels
DPA	s.s. Pfalz
DPB	s.s. Prinz Heinrich
DPC	s.s. Preussen
DPD	s.s. Prinzessin Heinrich
DPE	s.s. Prinz Eitel Friedrich
DPF	s.s. Pawnee
DPG	s.s. Prinzregent
DPI	s.s. Prinz Eitel Friedrich
DPJ	s.s. Palatia
DPL	s.s. Prinz Ludwig
DPM	s.s. Peter Rickmers
DPN	s.s. Prinzessin
DPO	s.s. Polynesia
DPP	s.s. Prinzessin Sophie Charlotte
DPQ	s.s. Posen
DPT	s.s. Präsident
DPU	s.s. Phoebus
DPW	s.s. Professor Woermann
DPX	s.s. Pommern
DPY	s.s. Poseidon
DPZ	s.s. Kronprinz
DQI	s.s. Brasilia
DQN	s.s. Granada
DRA	s.s. Roda
DRB	s.s. Roland
DRC	s.s. Corcovado
DRE	s.s. Rhaetia
DRF	s.s. Rabenfels
DRH	s.s. Rhakotis
DRI	s.s. Regina
DRJ	s.s. Rheinland
DRK	s.s. Rappenfels
DRL	s.s. Prinz-Regent Luitpold
DRM	s.s. Ramses
DRN	s.s. Roon
DRP	s.s. Rio Pardo
DRQ	s.s. Rio Negro
DRR	s.s. Rio Grande
DRS	s.s. Rhodopis
DRT	s.s. Rotenfels
DRU	s.s. Rugia
DRV	s.s. Roland
DRW	s.s. Rolandseck
DRX	s.s. Elisabeth Rickmers
DRY	s.s. Sophie Rickmers
DRZ	s.s. Rhenania
DSA	s.s. Scharnhorst
DSB	s.s. Prinz August Wilhelm
DSC	s.s. Stephan
DSD	s.s. Senator von Berenberg Gossler
DSE	s.s. Seeadler
DSG	s.s. Prinz Sigismund
DSH	s.s. Salamanca
DSI	s.s. Prinz Eitel Friedrich
DSJ	s.s. Sardinia
DSK	s.s. Sperber
DSL	s.s. Schwalbe
DSM	s.s. Sarnia
DSN	s.s. Schwan
DSO	s.s. Spreewald
DSP	s.s. Prinz Joachim
DSQ	s.s. Silvia
DSR	s.s. Syria
DSS	s.s. Senator Schäfer
DST	s.s. Kleist
DSU	s.s. Düsseldorf
DSV	s.s. Sibiria
DSW	s.s. Schleswig
DSX	s.s. Schwarzwald
DSY	s.s. Sydney
DSZ	s.s. Seydlitz
DTA	s.s. Tabora
DTB	s.s. Tasmania
DTC	s.s. Tecumsch
DTD	s.s. Diedrich
DTE	s.s. Thessalia
DTH	s.s. Sithonia
DTI	s.s. Trifels
DTK	s.s. Staatssekretar Kraetke
DTM	s.s. Heinz
DTN	s.s. Triton
DTO	s.s. Santos
DTQ	s.s. Artemisia
DTR	s.s. Trautenfels
DTS	s.s. Tannenfels
DTT	s.s. Canstatt
DTU	s.s. Thuringia
DTV	s.s. Pagenturm
DTX	s.s. Schildturm
DUA	s.s. Arsterturm
DUD	s.s. Sumatra
DUE	s.s. Ravenfels
DUG	s.s. Schwarzburg
DUL	s.s. Ursula Rickmers
DUM	s.s. Steinturm
DUN	s.s. Kamerun
DUR	s.s. Sturmfels
DUT	s.s. Utgard
DUU	s.s. Uarda
DVA	s.s. Sierra Salvada
DVC	s.s. Valencia
DVE	s.s. Sierra Ventana
DVI	s.s. Virginia
DVL	s.s. Valecia
DWA	s.s. Wangard
DWB	s.s. Washington
DWC	s.s. Wartburg
DWD	s.s. Wittekind
DWE	s.s. Westerwald

DWG	*s.s.* Wasgenwald	EDE	*s.s.* C. de Elizaguirre
DWH	*s.s.* Willehad	EDF	*s.s.* Fernando Poo
DWI	*s.s.* Wiegrand	EDG	*s.s.* Legazpi
DWK	*s.s.* Windhuk	EDH	*s.s.* C. Lopez y Lopez
DWL	*s.s.* Wildenfels	EDI	*s.s.* Infanta Isabel de Borbon
DWN	*s.s.* Willkommen	EDK	*s.s.* Reina Maria Cristina
DWO	*s.s.* Wotan	EDL	*s.s.* Antonio Lopez
DWR	*s.s.* Wismar	EDM	*s.s.* Manuel Calvo
DWS	*s.s.* Wilhelms	EDN	*s.s.* Montserrat
DWT	*s.s.* Warturm	EDO	*s.s.* Leon XIII.
DWU	*s.s.* Wurzenburg	EDP	*s.s.* Isla Depanay
DWV	*s.s.* Wartenfels	EDS	*s.s.* P. de Satrustegui
DXA	*s.s.* Scharzfels	EDT	*s.s.* Alfonso XIII.
DXB	*s.s.* Schönfels	EDU	*s.s.* Reina Victoria Eugenia
DXC	*s.s.* Arcadia	EDV	*s.s.* Montevideo
DXD	*s.s.* Schaumburg	EDW	*s.s.* M. L. Villaverde
DXM	*s.s.* Armenia	EDZ	*s.s.* Ciudad de Cadiz
DXR	*s.s.* Reichenfels	EEA	*s.s.* Auxias-March
DXS	*s.s.* Sioux	EEB	*s.s.* Barcelo
DXW	*s.s.* Alexandra Woermann	EEC	*s.s.* Cabañal
DYA	*s.s.* Ypiranga	EED	*s.s.* Denia
DYC	*s.s.* Salatis	EEF	*s.s.* Vicente Ferrer
DYD	*s.s.* Sakkarah	EEG	*s.s.* Guao
DYE	*s.s.* Sebara	EEH	*s.s.* J. B. Llovera
DYF	*s.s.* Setos	EEI	*s.s.* Jatiba
DYH	*s.s.* Sisak	EEJ	*s.s.* Jorge Juan
DYK	*s.s.* Yorck	EEK	*s.s.* Canalejas
DYR	*s.s.* Etha Rickmers	EEL	*s.s.* A. Lazaro
DZG	*s.s.* Harzburg	EEM	*s.s.* M. Benlluire
DZN	*s.s.* Zeiten	EEO	*s.s.* Sagunto
EAA	Madrid (Aranjuez)	EEP	*s.s.* V. Puchol
EAB	Barcelona EAB (Prat de Llobregat)	EEQ	*s.s.* Alcira
		EER	*s.s.* Vicente la Roda
EAC	Cadiz EAC	EES	*s.s.* J. S. Sister
EAF	Finisterre	EET	*s.s.* Teodoro Llorente
EAL	Palmas (Las)	EEV	*s.s.* Luis Vives
EAO	Sóller	EEW	*s.s.* Villarreal
EAP	Cabo de Palos	EEZ	*s.s.* Vicente Sanz
EAS	Santander (Cabo Mayor)	EFA	*s.s.* Atlante
EAT	Teneriffe	EFB	*s.s.* Bellver
EAV	Vigo (Pontevedra)	EFC	*s.s.* Cataluna
EAY	Santa Isabel de Fernando Poo	EFD	*s.s.* Delfia
EBD	*w.s.* Pelayo	EFF	*s.s.* Francoli
EBE	*w.s.* Emperador Carlos V.	EFH	*s.s.* Hesperides
EBF	*w.s.* Cataluña	EFI	*s.s.* Isleno
EBG	*w.s.* Princesa de Asturias	EFJ	*s.s.* Rey Jaime I.
EBH	*w.s.* Reina Regente	EFL	*s.s.* Lulio
EBI	*w.s.* Giralda	EFM	*s.s.* Miramar
EBJ	*w.s.* Extremadura	EFN	*s.s.* Menorquin
EBK	*w.s.* Rio de la Plata	EFO	*s.s.* Isla de Menorea
EBL	*w.s.* Infanta Isabel	EFQ	*s.s.* Monte Toro
EBM	*w.s.* Alvaro de Bazán	EFR	*s.s.* Balear
EBY	San Fernando (Cádiz)	EFS	*s.s.* Sitges
EBZ	Madrid EBZ	EFS	*s.s.* Rey Jaime II.
ECA	*s.s.* Balmes	EFT	*s.s.* Mahon
ECB	*s.s.* Barcelona	EFU	*s.s.* Turia
ECC	*s.s.* Cadiz	EFV	*s.s.* Reina Victoria
ECN	*s.s.* Pio IX.	EGA	Almeria
ECP	*s.s.* Miguel M. Pinillos	EGB	Melilla
ECT	*s.s.* Catalina	EGC	Madrid EGC
ECV	*s.s.* Valbanera	EGD	Ceuta
ECW	*s.s.* Conde Wifredo	EGE	Barcelona EGE
ECY	*s.s.* Infanta Isabel	EGF	Larache
ECZ	*s.s.* Martin Saenz	EGG	Valencia
EDA	*s.s.* Alicante	EGH	Bilbao
EDB	*s.s.* Buenos Aires	EGI	Mahon
EDC	*s.s.* Cataluña	EGJ	Coruña
EDD	*s.s.* Alfonso XII.	EGZ	Guadalajara

FAE	*s.s.* Espagne	FMA	*s.s.* Amazone
FAI	*s.s.* Italie	FMA	Monrovia
FAO	Hanoi	FMC	*s.s.* Chili
FAP	*s.s.* Provence	FML	*s.s.* Lotus
FCA	Cap-Saint-Jacques	FMT	*s.s.* Atlantique
FCC	*s.s.* Ceylan	FNL	Flannan Islands
FCG	*s.s.* Amiral Rigault de Genouilly	FNO	*w.s.* Floriano
		FNP	*s.s.* Paul Lecat
FCM	*s.s.* Malte	FNT	Fastnet
FCO	Conakry	FPC	*s.s.* Chaouia
FCR	*s.s.* Afrique	FPE	Port-Etienne
FCT	*s.s.* Amiral Troude	FPI	*s.s.* Iméréthie
FCU	*s.s.* Europe	FRA	*s.s.* Liamone
FDA	Dakar	FRB	*s.s.* Iberia
FDG	Diégo-Suarez	FRC	*s.s.* Corsica
FDO	Dzaoudzi	FRG	Varna
FFA	Ajaccio TSF	FRI	*s.s.* Italia
FFB	Boulogne-sur-mer TSF	FRN	*s.s.* Numidia
FFC	Cherbourg TSF	FRO	*s.s.* Golo
FFD	Dunkerque TSF	FRR	*s.s.* Corte II.
FFF	Ouessant	FRU	Rufisque
FFG	Cros-de-Cagnes	FSB	*s.s.* Bretagne
FFI	Dieppe	FSC	*s.s.* Gascogne
FFK	Brest – Kerlaer	FSD	*s.s.* Divona
FFL	Lorient TSF	FSG	*s.s.* Garonna.
FFO	Fort-de-l'Eau	FSL	*s.s.* Liger
FFP	Porquerolles	FSU	*s.s.* Burdigala
FFR	Rochefort	FTA	Tabou
FFS	S. Maries-de-la-Mer	FTA	*s.s.* Champagne
FFT	Cap Bon	FTB	*s.s.* Niagara
FFX	Bouscat	FTC	*s.s.* Caravelle
FGA	*s.s.* Ville d'Oran	FTD	*s.s.* Provence
FGB	*s.s.* Ville de Bone	FTE	*s.s.* Espagne
FGC	*s.s.* Carthage	FTF	*s.s.* Floride
FGD	*s.s.* Duc d'Aumale	FTG	*s.s.* Guadeloupe
FGG	*s.s.* Duc-de-Bragance	FTH	*s.s.* Hudson
FGK	*s.s.* Abd-el-Kader	FTI	*s.s.* Chicago
FGL	*s.s.* Ville de Barcelone	FTJ	*s.s.* Montreal
FGM	*s.s.* Ville de Madrid	FTK	*s.s.* Californie
FGN	*s.s.* Ouessant	FTL	*s.s.* Lorraine
FGN	*s.s.* Ville de Naples	FTM	*s.s.* Martinique
FGO	Loango	FTN	*s.s.* Navarre
FGO	*s.s.* Timgad	FTO	*s.s.* Caroline
FGP	*s.s.* Eugene Pereire	FTP	*s.s.* Pérou
FGQ	*s.s.* Ville d'Alger	FTQ	*s.s.* Québec
FGR	*s.s.* Charles Roux	FTR	*s.s.* Rochambeau
FGS	*s.s.* Moise	FTS	*s.s.* Savoie
FGT	*s.s.* Ville de Tunis	FTT	*s.s.* Touraine
FGV	*s.s.* Versailles	FTU	*s.s.* Lousiane
FGY	*s.s.* Maréchal Bugeaud	FTV	*s.s.* Virginie
FHC	*s.s.* Sacha	FTW	*s.s.* Venezuela
FHE	*s.s.* Emma	FTX	*s.s.* Mexico
FHG	*s.s.* Jeanne	FTY	*s.s.* St. Laurent
FHH	*s.s.* Henriette	FTZ	*s.s.* France
FHI	*s.s.* Marie Rose	FUA	Bizerte
FHJ	*s.s.* Jeannette	FUB	Brest Arsenal
FHK	*s.s.* Marguerite Marie	FUE	Toulon-Ecole
FHL	*s.s.* Loire (La)	FUO	Aïn-El-Turk
FHO	*s.s.* Charlotte	FUT	Toulon-Mourillon
FJA	Majunga	FUV	Port-Vendres
FJC	*s.s.* Canada	FVA	*s.s.* Algérie
FJG	*s.s.* Germania	FVB	*s.s.* Sidi-Brahim
FJM	*s.s.* Madonna	FVF	*s.s.* France
FJR	*s.s.* Roma	FVI	*s.s.* Ile de France
FJS	*s.s.* St. Anna	FVL	*s.s.* Plata
FJV	*s.s.* Venezia	FVN	*s.s.* Parana
FKA	Kien-An	FVO	*s.s.* Formosa
FL	Paris (Eiffel Tower)	FVP	*s.s.* Pampa

FVS	*s.s.* Salta
FVV	*s.s.* Valdivia
FWA	Quang-Tchéou-Wan
FXA	*s.s.* Mustapha
FXB	*s.s.* Manouba
FXD	*s.s.* Djurjura
FXJ	*s.s.* Medjerda
FXM	*s.s.* Théodore Mante
FXR	*s.s.* Marsa
FYA	*s.y.* Atmah
FYB	*s.y.* Bacchante
FYP	*s.y.* Apache
FYR	*s.y.* Résolue
FYS	*s.y.* Eros
FZN	*s.s.* Nord
FZP	*s.s.* Pas-de-Calais
GAE	*s.s.* Waneta
GAG	*s.s.* Santa Rosalia
GAH	*s.s.* Andania
GAI	*s.s.* Alaunia
GAJ	*s.s.* Hawkes Bay
GAK	*s.s.* Dewa
GAL	*s.s.* Crofton Hall
GAM	*s.s.* Monmouthshire
GAN	*s.y.* Eileen
GAO	*s.s.* City of York
GAP	*s.s.* Isis
GAQ	*s.s.* Osiris
GAS	*s.s.* Rowanmore
GAT	*s.s.* Herbert G. Wylie
GAU	*s.s.* Jose de Larrinaga
GAV	*s.s.* Ghazee
GAW	*s.s.* Kentra
GAY	*s.s.* Bantu
GAZ	*s.s.* Niceto de Larrinaga
GB	Glace Bay
GBB	*s.s.* City of Poona
GBD	*s.s.* Tongariro
GBE	*s.s.* Niagara
GBG	*s.s.* Nevasa
GBH	*s.s.* Trinidad
GBI	*s.s.* Colusa
GBJ	*s.s.* Benalla
GBK	*s.s.* Den of Airlie
GBL	*s.s.* Den of Crombie
GBM	*s.s.* Den of Glamis
GBN	*s.s.* Bloemfontein
GBO	*s.s.* Gujurat
GBP	*s.s.* Kasama
GBQ	*s.s.* Nestor
GBR	*s.s.* Caribbean
GBS	*s.s.* Toronto
GBU	*s.s.* Ulysses
GBW	*s.s.* City of Karachi
GBY	*s.s.* Kalomo
GBZ	*s.s.* Whakarua
GCA	Tobermory
GCB	Lochboisdale
GCC	Cullercoats
GCD	*s.s.* Nagoya
GCE	*s.s.* Custodian
GCG	*s.s.* Mechanician
GCH	*s.s.* Bankura
GCI	*s.s.* Wayfarer
GCJ	*s.s.* Ardeolo
GCK	Crookhaven
GCL	*s.s.* Borderer
GCM	*s.s.* Barala
GCN	*s.s.* Chagres
GCO	*s.s.* Dakar
GCP	*s.s.* Drumcree
GCQ	*s.s.* Hurunui
GCR	*s.s.* Indrapura
GCS	Caister-on-Sea
GCT	*s.s.* Barjora
GCV	*s.s.* Neuralia
GCW	*s.s.* Navara
GCY	*s.s.* Poleric
GDB	*s.s.* Patuca
GDD	*s.s.* City of Dunkirk
GDE	*s.s.* Drumlanrig
GDG	*s.s.* Tennyson
GDH	*s.s.* Byron
GDI	*s.s.* Abosso
GDJ	*s.s.* Appam
GDK	*s.s.* Chaudiere
GDL	*s.s.* Baroda
GDM	*tug* Cernicalo
GDN	*s.s.* Kentucky
GDO	*s.s.* Bovic
GDP	*s.s.* City of Lincoln
GDQ	*s.s.* Cevic
GDR	*s.s.* Cufic
GDS	*s.s.* Delphic
GDT	*s.s.* Georgic
GDU	*s.s.* Tropic
GDV	*s.s.* Ingoma
GDW	*s.s.* Cornishman
GDY	*s.s.* Englishman
GDZ	*s.s.* Manxman
GEA	*s.s.* Turcoman
GEB	*s.s.* Welshman
GEC	*s.s.* City of Bristol
GED	*s.s.* City of Benares
GEE	*s.s.* City of Calcutta
GEG	*s.s.* Saldanha
GEH	*s.s.* Katuna
GEI	*s.s.* Kabinga
GEJ	*s.s.* Karonga
GEK	*s.s.* Kasenga
GEL	*s.s.* Surat
GEM	*s.s.* Kathiawar
GEN	*s.s.* City of Lahore
GEO	*s.s.* City of Naples
GEP	*s.s.* City of Birmingham
GEQ	*s.s.* Melford Hall
GER	*s.s.* City of Paris
GES	*s.y.* Valiant
GET	*s.s.* City of Durham
GEU	*s.s.* City of Glasgow
GEV	*s.s.* City of London
GEW	*s.s.* City of Marseilles
GEY	*s.s.* Mashona
GEZ	*s.s.* Kioto
GFE	*s.s.* Agadir
GFF	*s.s.* Aguila
GFG	*s.s.* Beacon Grange
GFH	*s.s.* Alnwick Castle
GFI	*s.s.* Amber
GFJ	*s.s.* Berwick Castle
GFK	*s.s.* Berwindmoor
GFL	*s.s.* Angora
GFM	*s.s.* Appalachee
GFN	*s.s.* Arankola
GFO	*s.s.* Arcadia
GFP	*s.s.* Arlanza

GFQ	s.s. Arzila
GFR	s.s. Berwindvale
GFS	s.s. Bogota
GFT	s.s. Borneo
GFU	s.s. Braemar Castle
GFV	s.s. Britannia
GFW	s.s. Buffalo
GFY	s.s. Calypso
GFZ	s.s. Cawdor Castle
GGB	s.s. Cheyenne
GGC	s.s. Chile
GGD	s.s. Chilka
GGE	s.s. Cluny Castle
GGF	s.s. Cocconada
GGG	s.s. Comanchee
GGH	s.s. Commonwealth
GGI	s.s. Comrie Castle
GGJ	s.s. Darro
GGK	s.s. Delaware
GGL	s.s. Deseado
GGM	s.s. Desna
GGN	s.s. Demerara
GGO	s.s. Drina
GGP	s.s. Duendes
GGQ	s.s. Edavana
GGR	s.s. Egra
GGS	s.s. Ekma
GGT	s.s. Argentino (El)
GGU	s.s. Elephanta
GGV	s.s. Ellenga
GGW	s.s. Ellora
GGY	s.s. Paraguayo (El)
GGZ	s.s. Uruguayo (El)
GHC	Hunstanton
GHE	s.s. Eskimo
GHF	s.s. Esmeraldas
GHG	s.s. Flamenco
GHH	Heysham Harbour
GHI	s.s. Francisco
GHJ	s.s. East Point
GHK	s.s. Cartago
GHL	s.s. Abangarez
GHM	s.s. Crown Point
GHN	s.s. Turrialba
GHO	s.s. Almirante
GHP	s.s. Atenas
GHQ	s.s. Carrillo
GHR	s.s. Heredia
GHS	s.s. Metapan
GHT	s.s. Parismina
GHU	s.s. Santa Marta
GHV	s.s. Sixraola
GHW	s.s. Tivives
GHY	s.s. Zacapa
GHZ	s.s. South Point
GIA	s.s. Start Point
GIB	s.s. St. George
GIC	s.s. City of Delhi
GID	s.y. Conqueror
GIF	s.s. Berbice
GIG	s.s. Galicia
GIH	s.s. Balantia
GII	s.s. Galileo
GIJ	s.s. Geelong
GIK	s.s. West Point
GIL	s.s. Hantonia
GIM	s.s. Aparima
GIN	s.s. Hermione
GIO	s.s. Hesperides
GIP	s.s. Highland Brae
GIQ	s.s. Highland Corrie
GIR	s.s. Highland Glen
GIS	s.s. Malda
GIT	s.s. Manora
GIU	s.s. Highland Laddie
GIV	s.s. C. A. Canfield
GIW	s.s. North Point
GIY	s.s. Highland Loch
GJA	s.s. Highland Pride
GJB	s.s. Highland Rover
GJC	s.s. Highland Scot
GJD	s.s. Highland Warrior
GJE	s.s. Honorius
GJF	s.s. Huanchaco
GJG	s.s. Hyancinthus
GJH	s.s. Hydaspes
GJI	s.s. Hypatia
GJJ	s.s. Idaho
GJK	s.s. Irishman
GJL	s.s. Junin
GJM	s.s. Kelvinbank
GJN	s.s. Kelvindale
GJO	s.s. Kenuta
GJP	s.s. Kia Ora
GJQ	s.s. Kumeric
GJR	s.s. Blanca (La)
GJS	s.s. Laconia
GJT	s.s. Correntina (La)
GJU	s.s. Marguerite (La)
GJV	s.s. Lackawanna
GJW	s.s. Rosarina (La)
GJY	s.s. Levant II.
GJZ	s.s. Luceric
GKA	s.s. Letitia
GKB	s.s. Makarini
GKC	s.s. Ashtabula
GKD	s.s. Malta
GKE	s.s. Mamari
GKG	s.s. Canning
GKH	s.s. Manchester City
GKI	s.s. Eagle Point
GKJ	s.s. Marengo
GKK	s.s. Manhattan
GKL	s.s. Matatua
GKM	s.s. Michigan
GKN	s.s. Namur
GKO	s.s. Naneric
GKP	s.s. Nankin
GKQ	s.s. Narrung
GKR	s.s. Empress of Asia
GKS	s.s. Knight Companion
GKT	s.s. Knight Templar
GKU	s.s. Nile
GKV	s.s. Nore
GKW	s.s. Normannia
GKY	s.s. Nyanza
GKZ	s.s. Nubia
GLA	s.s. Oriental
GLB	s.s. Huntsman
GLC	s.s. Paris
GLD	Land's End
GLE	s.s. Orteric
GLF	s.s. Kathlamba
GLG	s.s. Pakeha
GLH	s.s. Trinidadian
GLJ	s.s. Palawan

GLK	*s.s.* Parana	GPR	*s.s.* Londonderry
GLL	*s.s.* Pardo	GPS	*s.s.* Manxman
GLN	*s.s.* Peru	GPZ	*s.s.* Escalona
GLO	*s.s.* Pomeranian	GQA	*s.s.* Ayrshire
GLP	*s.s* Potaro	GQB	*s.s.* Perthshire
GLQ	*s.s.* Potomac	GQC	*s.s.* Durham
GLR	*s.s.* Prince George	GQD	*s.s.* Somerset
GLS	*s.s.* Prince Rupert	GQE	*s.s.* Sequoya
GLT	*s.s.* Quilpue	GQF	*s.s.* Indraghiri
GLU	*s.s.* Ramos	GQG	*s.s.* Sir Richard Awdry
GLV	Seaforth (Liverpool)	GQI	*s.s.* Grive
GLW	*s.s.* Rangatira	GQJ	*s.s.* Arabistan
GLY	*s.s.* Roseric	GQK	*s.s.* Kohistan
GLZ	*s.s.* Royston Grange	GQL	*s.s.* Wapello
GMA	*c.s.* Restorer	GQQ	*s.s.* Indrakuala
GMB	*s.s.* Sardinia	GQR	*s.s.* Lady Crundall
GMC	*s.s.* Sicilia	GQS	*s.s.* Lady Brassey
GMD	*c.s.* Silvertown	GQT	*s.s.* Armadale
GME	*s.s.* Simla	GQU	*s.s.* Arrino
GMF	*s.s.* Star of Ireland	GQV	*s.s.* Ashburton
GMG	*s.s.* Knight of the Thistle	GQW	*s.s.* Australind
GMH	Malin Head	GRE	*s.s.* Anglia
GMI	*s.s.* Indore	GRG	*s.s.* Cambria
GMJ	*s.s.* Sumatra	GRL	Fishguard
GMK	*s.s.* Bayano	GRN	Rathlin Island
GML	*s.s.* Sunda	GRR	*s.s.* Scotia
GMM	*s.s.* Sutherland Grange	GRW	*s.s.* Hibernia
GMN	*s.s.* Chaleur	GRY	*s.s.* Dorset
GMO	*s.s.* Suveric	GRZ	*s.s.* Ixion
GMP	*s.s.* Syria	GSA	*s.s.* Uncas
GMQ	*s.s.* Tara	GSB	*s.s.* Port Macquarrie
GMR	*s.s.* Taroba	GSC	*s.s.* Protesilaus
GMS	*s.s.* Mashobra	GSD	*s.s.* Tascalusa
GMT	*s.s.* Teesta	GSE	*s.s.* Restitution
GMU	*s.s.* Thongwa	GSF	*s.s.* Shropshire
GMV	*s.s.* Tonawanda	GSG	*s.s.* Tamaha
GMY	*s.s.* Merkara	GSH	*s.s.* Talthybius
GMZ	*s.s.* Vasari	GSI	*s.s.* Tahchee
GNA	*s.s.* Salamis	GSJ	*s.s.* Teucer
GNB	*s.s.* Verdi	GSK	*s.s.* Tatarrax
GNC	*s.s.* City of Edinburgh	GSL	Ballycastle, Antrim
GND	*s.s.* Voltaire	GSM	*s.s.* Winamac
GNE	*s.s.* Waimana	GSN	Skegness
GNF	North Foreland	GSO	*s.s.* Titan
GNH	*s.s.* Wilcannia	GSP	Whaler COJ
GNI	Niton	GSQ	Whaler GDI
GNK	*s.s.* Waipara	GSR	Whaler TWI
GNM	*s.s.* Highland Piper	GSS	*s.s.* Shabonee
GNN	*s.s.* Jabberwock	GST	*s.s.* Peregrine
GNR	*s.s.* Tudno	GSU	*s.s.* Wiltshire
GNS	*s.s.* Karroo	GSV	*s.s.* Mekong
GNT	*s.s.* Buenaventura	GSW	*s.s.* Indrani
GNV	Newhaven	GSY	*s.s.* Indradeo
GOS	*s.s.* Drumcliffe	GSZ	*s.s.* Indra
GOW	*s.s.* Denbigh Hall	GTA	*s.s.* Fauvette
GPC	*s.s* City of Baroda	GTB	*s.s.* Massasoit
GPF	*s.s.* Amsterdam	GTC	*s.s.* Antilochus
GPG	*s.s.* Brussels	GTD	*s.s.* Bellerophon
GPH	*s.s.* Colchester	GTF	*s.s.* Cyclops
GPI	*s.s.* Copenhagen	GTG	*s.s.* Satanta
GPJ	*s.s.* Munich	GTH	*s.s.* Samoset
GPK	*s.s.* St. Petersburg	GTI	*s.s.* Ajana
GPL	*s.s.* Vienna	GTJ	*s.s.* Argyllshire
GPM	*s.s.* Dresden	GTK	*s.s.* Carsten Bruun
GPN	*s.s.* Antrim	GTM	*s.s.* Kanakuk
GPO	*s.s.* Donegal	GTN	*s.s.* Wabasha
GPP	*s.s.* Duchess of Devonshire	GTO	*s.s.* Erris
GPQ	Parkeston Quay	GTP	*s.s.* Faraday

GTQ	s.s. Keemun	IBL	w.s. Dardo
GTR	s.s. Masconomo	IBM	w.s. Espero
GTS	c.s. Monarch	IBN	w.s. Euro
GTT	s.s. Ponus	IBO	w.s. Fucilierre
GTU	s.s. Oanfa	IBP	w.s. Fulmine
GTV	s.s. Oneka	IBQ	w.s. Garibaldino
GTW	s.s. Powhatan	IBR	w.s. Granatiere
GTY	s.s. Aspinet	IBS	w.s. Indomito
GTZ	s.s. Port Lincoln	IBT	w.s. Insidioso
GU	Guernsey	IBU	w.s. Intrepido
GUC	s.s. Magdalena	IBV	w.s. Impavido
GUD	s.s. Orotava	IBW	w.s. Impetuoso
GUE	s.s. Oruba	IBX	w.s. Irrequieto
GUF	s.s. Tagus	IBY	w.s. Lampo
GUG	s.s. Thames	IBZ	w.s. Lanciere
GUH	s.s. Trent	ICA	Monte Cappuccini
GUI	s.s. Empress	ICB	Castellaccio (Genoa)
GUJ	s.s. City of Bombay	ICC	Castiadas-Calasinzias (Cagliari)
GUK	s.s. Engadine		
GUL	s.s. Invicta	ICD	Roma
GUM	s.s. Onward	ICE	Brindisi
GUN	s.s. Queen (The)	ICH	Isola Chiesa
GUO	s.s. Riviera	ICI	Coltano
GUP	s.s. Victoria	ICL	Ilha das Cobras
GUQ	s.s. Minia	ICL	S. Maria di Leuca
GUR	Folkestone Harbour	ICM	Viesti
GUY	s.s. Dacia	ICN	Castel S. Elmo (Naples)
GUZ	s.s. Ajax	ICP	Sferracavallo (Palermo)
GVA	Cross Sand Lightship	ICQ	S. Cataldo di Bari
GVB	East Goodwin Lightship	ICR	Ponta Sperone
GVC	Gull Lightship	ICS	Spezia
GVD	South Goodwin Lightship	ICT	Taranto
GVE	Sunk Lightship	ICV	Vittoria
GVF	Tongue Lightship	ICX	Massana
GYA	s.s. City of Norwich	ICZ	Venezia (Carbonera)
GYC	s.s. Den of Ruthven	IDA	w.s. Nembo
GYD	s.s. Matura	IDB	w.s. Ostro
GYF	s.s. Exmouth II.	IDC	w.s. Pontiere
GYG	s.s. City of Colombo	IDD	w.s. Strale
GYH	s.s. Alsatian	IDE	w.s. Turbine
GYI	s.s. Salmo	IDF	w.s. Zeffiro
GYJ	s.s. St. Andrew	IEA	s.s. S. Giorgio
GYK	s.s. Vedamore	IEB	s.s. S. Guglielmo
GYL	s.s. St. David	IEC	s.s. S. Giovanni
GYM	s.s. St. Patrick	IED	s.s. Brasile
GYN	s.s. San Fraterno	IEE	s.s. Europa
GYP	s.s. Kaipara	IEF	s.s. Stampalia
GYQ	s.s. Kazembe	IEG	s.s. Citta di Milano
GYR	s.s. Edward L. Doheny	IEH	s.s. Savoia
GYS	s.s. Vitruvia	IEI	s.s. Citta di Torino
GYT	s.s. Quernmore	IEN	s.s. Citta di Messina
GYU	s.s. Charles E. Harwood	IEP	s.s. Citta di Palermo
GYV	s.s. Desabla	IES	s.s. Citta di Siracusa
GYW	s.s. Barneson	IET	s.s. Citta di Catania
GYY	s.s. Koranna	IFM	Messina
GYZ	s.s. Star of India	IFR	Reggio Calabria
GZZ	s.s. Roscommon	IFV	Villa San Giovanni
IBA	w.s. Ardito	IGB	Bologna
IBB	w.s. Ardente	IGF	Firenze
IBC	w.s. Audace	IGM	Milan
IBD	w.s. Animoso	IGT	Torino
IBE	w.s. Alpino	IGV	Treviso
IBF	w.s. Aquilone	IH	Inishtrahull
IBG	w.s. Artigliere	IHA	w.s. Andrea Dorea
IBH	w.s. Bersagliere	IHB	w.s. Duilio
IBI	w.s. Borea	IHC	w.s. Dante Alighieri
IBJ	w.s. Carabiniere	IHD	w.s. Conte di Cavour
IBK	w.s. Corazziere	IHE	w.s. Giulio Cesare

IHF	*w.s.* Leonardo da Vinci	ISN	Bardera
IHG	*w.s.* Italia	ISO	Lugh
IHH	*w.s.* Dandolo	ITA	*s.s.* Ancona
IHI	*w.s.* Benedetto Brin	ITB	*s.s.* Bologna
IHJ	*w.s.* Regina Margherita	ITR	*s.s.* Ravenna
IHK	*w.s.* Re Umberto	ITS	*s.s.* Siena
IHL	*w.s.* Sicilia	ITT	*s.s.* Toscana
IHM	*w.s.* Sardegna	ITU	*s.s.* Umbria
IHN	*w.s.* Vittorio Emanuele	ITV	*s.s.* Verona
IHO	*w.s.* Napoli	IUC	*s.s.* Cavour
IHP	*w.s.* Roma	IUG	*s.s.* Garibaldi
IHQ	*w.s.* Regena Elena	IUM	*s.s.* Minas
IHR	*w.s.* Pisa	IUU	*s.s.* Re Umberto
IHS	*w.s.* Amalfi	IVA	*w.s.* Bronte
IHT	*s.s.* S. Marco	IVB	*w.s.* Sterope
IHU	*s.s.* S. Giorgio	IVC	*w.s.* Trinacria
IHV	*w.s.* Ammiraglio Saint Bon	IVD	*w.s.* Giovanni Bausan
IHW	*w.s.* Emanuele Filiberto	IVE	*w.s.* Flavio Gioja
IHX	*w.s.* Giuseppe Garibaldi	IVF	*w.s.* Vulcano
IHY	*w.s.* Varese	IVG	*w.s.* Amerigo Vespucci
IHZ	*w.s.* Francesco Ferruccio	IVH	*w.s.* Volta
IKA	*w.s.* Carlo Alberta	IVI	*w.s.* Bengasi
IKB	*w.s.* Vettor Pisani	IVJ	*w.s.* Citta di Milano
IKC	*w.s.* Marco Polo	IVK	*w.s.* Staffetta
IKD	*w.s.* Quarto	IVL	*w.s.* Curtatone
IKE	*w.s.* Marsala	IVM	*w.s.* Volturno
IKF	*w.s.* Nino Bixio	IVN	*w.s.* Governolo
IKG	*w.s.* Etna	IVO	*w.s.* Eridano
IKH	*w.s.* Libia	IVP	*w.s.* Galileo Galilei
IKI	*w.s.* Elba	IVQ	*w.s.* Ciclope
IKJ	*w.s.* Piemonte	IVR	*w.s.* M. A. Colonna
IKK	*w.s.* Puglia	IVS	*w.s.* Capitano Verri
IKL	*w.s.* Basilicata	IVT	*w.s.* Giuliana
IKM	*w.s.* Campania	IVU	*w.s.* Archimede
IKN	*w.s.* Calabria	IVV	*w.s.* Misurata
IKO	*w.s.* Lombardia	IVW	*w.s.* Tobruk
IKP	*w.s.* Etruria	IVX	*w.s.* Eritrea
IKQ	*w.s.* Liguria	IVY	*w.s.* Ammiraglio Magnaghi
IKR	*w.s.* Agordat	IVZ	*w.s.* Sebastiano Caboto
IKS	*w.s.* Coatit	IYI	*s.s.* Indiana
IKT	*w.s.* Iride	IYJ	*s.s.* Cordova
IKU	*w.s.* Goito	IYL	*s.s.* Luisiana
IKV	*w.s.* Tripoli	IYM	*s.s.* Principessa Mafalda
IKW	*w.s.* Caprera	IYR	*s.s.* Re d'Italia
IKX	*w.s.* Minerva	IYS	*s.s.*,Tomaso di Savoia
IKY	*w.s.* Partenope	IYT	*s.s.* Taormina
IKZ	*w.s.* Montebello	IYU	*s.s.* Principe di Udine
ILB	*s.s.* Bayonne	IYZ	*s.s.* Caserta
ILL	*s.s.* Lampo	IZA	*s.s.* America
ILS	*s.s.* Splendor	IZE	*s.s.* Regina Elena
INA	*s.s.* Porto di Adalia	IZG	*s.s.* Duca di Genova
IND	*s.s.* Port Said	IZI	*s.s.* Italia
INI	*s.s.* Regina d'Italia	IZL	*s.s.* Palermo
INL	*s.s.* Sicilia	IZS	*s.s.* Napoli
INM	*s.s.* Milano	IZT	*s.s.* Duca d'Aosta
INO	*s.s.* Torino	IZU	*s.s.* Principe Umberto
INR	*s.s.* Roma	IZV	*s.s.* Re Vittorio
INS	*s.s.* Sardegna	IZZ	*s.s.* Duca degli Abruzzi
		JAC	*s.s.* America Maru
INZ	*s.s.* Firenze	JAM	*s.s.* Amakusa Maru
ISB	Merca	JAW	*s.s.* Awa Maru
ISC	Brava	JAY	*s.s.* Anyo Maru
ISD	Giumbo	JBG	*s.s.* Bingo Maru
ISE	Mogadiscio ISE	JBY	*s.s.* Buyo Maru
ISF	Mahaddei Uen	JCC	*s.s.* Chicago Maru
ISG	Mogadiscio ISG	JCD	*s.s.* Canada Maru
ISH	Iscia Baidoa	JCS	Choshi
ISM	Itala	JCY	*s.s.* Chyo Maru

JDA	Dairenwan
JFK	Fukkikaku
JGA	w.s. Shikishima
JGB	w.s. Asahi
JGC	w.s. Mikasa
JGD	w.s. Hizen
JGF	w.s. Katori
JGG	w.s. Kashima
JGJ	w.s. Satsuma
JGK	w.s. Aki
JGL	w.s. Kawachi
JGM	w.s. Settsu
JGP	w.s. Tsukuba
JGQ	w.s. Ikoma
JGR	w.s. Kurama
JGT	w.s. Ibuki
JGU	w.s. Kongo
JGV	w.s. Hiei
JHN	s.s. Hong Kong Maru
JHY	g.s Hayatori Maru
JKB	s.s. Kobe Maru
JKG	s.s. Kagi Maru
JKI	s.s. Sakaki Maru
JKO	s.s. Kayo Maru
JKT	s.s. Kasado Maru
JKY	s.s. Kiyo Maru
JLA	w.s. Kasagi
JLB	w.s. Chitose
JLC	w.s. Tsugaru
JLD	w.s. Soya
JLF	w.s. Tone
JLG	w.s. Chikuma
JLJ	w.s. Hirato
JLK	w.s. Yahagi
JLL	w.s. Suma
JLM	w.s. Akashi
JLN	w.s. Niritaka
JLO	w.s. Tsushima
JLP	w.s. Atowa
JMX	s.s. Mexico Maru
JNP	s.s Nippon Maru
JOC	Otchishi
JOS	Ozezaki
JPM	s.s. Panama Maru
JRB	w.s. Tokiwa
JRC	w.s. Yakumo
JRD	w.s. Adzuma
JRF	w.s. Iwate
JRG	w.s. Idzumo
JRJ	w.s. Kasuga
JRK	w.s. Nisshin
JRL	w s. Aso
JRY	w.s. Asama
JSA	s.s. Sanuki Maru
JSD	s.s. Sado Maru
JSH	s.s. Shinyo Maru
JSM	Shiomisaki
JSN	s.s. Shinano
JST	s.s. Seattle Maru
JSZ	s.s. Shidzuoka Maru
JTA	s.s Tacoma Maru
JTB	s.s. Tamba Maru
JTC	s.s. Taichu Maru
JTK	s.s. Teikoku Maru
JTM	s.s. Taisei Maru
JTN	s.s. Tainan Maru
JTS	Tsunoshima
JTY	s.s. Tenyo Maru

JUA	w.s. Iki
JUB	w.s. Tango
JUC	w.s. Fuji
JUD	w.s. Iwami
JUF	w.s. Sagami
JUG	w.s. Suwo
JUK	w.s. Okinoshima
JUL	w.s. Mishima
JUM	w.s. Takachiho
JUN	w.s. Itsukushima
JUO	w.s. Hashidate
JUP	w.s. Chiyoda
JUQ	w.s. Akitsushima
JUT	w.s. Manshu
JUU	w.s. Toyohashi
JUX	w.s. Yamato
JUY	w.s. Musashi
JUZ	w.s. Matsuye
JWA	w.s. Tatsuta
JWB	w.s. Chihaya
JWC	w.s. Yodo
JWD	w.s. Mogami
JWF	w.s. Uji
JWG	w.s. Sumida
JWJ	w.s. Fushimi
JWK	w.s. Toba
JWL	w.s. Saga
JTH	s.s. Yokohama Maru
KAB	Monrovia KAB
KAC	Daressalam
KAF	Amrumbank Lightship
KAG	Adlergrund Lightship
KAH	Heligoland
KAJ	Eider Lightship
KAK	Swakopmunde
KAN	Angaur
KAU	Aussenjade Lightship
KAV	Norddeich
KAW	Swinemünde
KAZ	Danzig
KBF	Elbe Lightship Eins
KBH	Bremerhaven Lloydhalle
KBK	Bülk
KBM	Borkum New Lighthouse
KBN	Nauru
KBR	Borkum Riff Lightship
KBS	Tsingtau (Signalberg)
KBU	Duala
KCA	Jap
KCL	Eiderlotsengaliote Lightship
KCU	Luderitzbucht
KCV	Sassnitz
KCW	Weser Lightship
KCX	Cuxhaven
KDA	s.s. Philadelphia
KDB	s.s. Caracas
KDC	Douglas (Arizona)
KDM	s.s. Maracaibo
KDN	San Luisobispo (Cal.)
KDU	Juneau (Alaska)
KDV	s.s. Grayson
KDW	s.s. Borinquen
KDX	s.s. Bayamon
KDY	s.s. Yaguez
KDZ	s.s. Zulia
KEB	s.s. Sabine
KEC	s.s. Concuo
KED	s.s. Denver

KEG	*s.s.* Rio Grande
KEH	*s.s.* Nueces
KEJ	*s.s.* Alamo
KEK	*s.s.* S. Marcos
KEM	*s.s.* Comal
KEP	*s.s.* Lampasas
KES	*s.s.* San Jacinto
KEX	Los Angeles (Cal.)
KEZ	*s.s.* Brazos
KFA	*s.s.* City of Columbus
KFB	*s.s.* City of Atlanta
KFC	*s.s.* City of Macon
KFD	*s.s.* City of Memphis
KFF	*s.s.* Frieda
KFH	*s.s.* Herman Frasch
KFI	*s.s.* I. D. Fletcher
KFJ	*s.s.* City of Augusta
KFK	*s.s.* City of Savannah
KFP	*s.s.* Nacoochee
KFT	*s.s.* Tasco
KFX	*s.s.* City of St. Louis
KFY	*s.s.* City of Montgomery
KGA	*s.s.* Coamo
KGB	*s.s.* Carolina
KGJ	*s.s.* San Juan
KGP	*s.s.* Ponce
KGS	*tug* Senator Bailey
KHA	Karluk (Alaska)
KHB	Kogiung (Alaska)
KHC	Chignik (Alaska)
KHF	Nushagak (Alaska)
KHG	Clark's Point (Alaska)
KHJ	Koko Head
KHK	Kahuku
KHL	Lahaina
KHM	Lihue
KHN	Kawaikae
KHO	Kaunakakai
KHP	Daley City
KHQ	Phoenix (Arizona)
KHT	Naknek (Alaska)
KHX	Fecia Point
KIT	Kake (Alaska)
KIU	Burnett Inlet (Alaska)
KJA	Jualin (Alaska)
KJB	*s.s.* Bunker Hill
KJD	*s.s.* North Land
KJM	*s.s.* Massachusetts
KJO	*s.s.* Old Colony
KJS	*s.s.* North Star
KKA	*s.s.* Antilles
KKB	*s.s.* Sol (El)
KKC	*s.s.* Chalmette
KKD	*s.s.* Comus
KKE	*s.s.* Topila
KKL	*s.s.* Alba (El)
KKM	*s.s.* Momus
KKN	*s.s.* Norte (El)
KKO	*s.s.* Excelsior
KKP	*s.s.* Proteus
KKQ	*s.s.* Sud (El)
KKR	*s.s.* Creole
KKT	*s.s.* Cid (El)
KKV	*s.s.* Oriente (El)
KKW	*s.s.* Valle (El)
KKX	*s.s.* Occidente (El)
KKY	*s.s.* Dia (El)
KKZ	*s.s.* Rio (El)
KMA	*s.s.* Allianca
KMD	*s.s.* Cristobal
KME	*barge* Maine
KMH	*s.s.* Panama
KMO	*tug* C. W. Morse
KMS	*s.s.* Ancon
KMV	*s.s.* Advance
KMX	*s.s.* Colon
KNA	*s.s.* Dorothy Bradford
KNB	*s.s.* Lexington
KNC	*s.s.* Concord
KNE	*s.s.* Evelyn
KNF	*s.s.* Carolyn
KNJ	*s.s.* New Jersey
KNK	*s.s.* New York
KNL	*s.s.* Nelson
KNM	*s.s.* Millinocket
KNR	*s.s.* Zealandia
KNU	*s.s* Currier
KNZ	*s.s.* America
KOA	*s.s.* Hamilton
KOB	*s.s.* Princesse Anne
KOC	*s.s.* Jamestown
KOD	*s.s.* Jefferson
KOG	*s.s.* Madison
KOS	*s.s.* Brunswick
KOV	*s.s.* Olivette
KOW	*s.s.* Mascotte
KOZ	*s.s.* Miami
KPA	Seattle (Wash.)
KPB	Ketchikan (Alaska)
KPC	Astoria (Oregon)
KPD	Friday Harbour (Wash.)
KPF	*s.s.* Forwood
KPG	Astoria (Ore.)
KPH	San Francisco (Cal.)
KPI	Avalon (Cal.)
KPJ	San Pedro (Cal.)
KPK	*tug* Cuba
KPL	*s.s.* Pilotboy
KPM	Eureka (Cal.)
KPR	P. R. R. 707
KPW	*s.s.* Cape Cod
KPX	Marshfield (Ore.)
KQB	*s.s.* Berkshire
KQC	*s.s.* Cretan
KQD	*s.s.* Dorchester
KQE	*s.s.* Essex
KQG	*s.s.* Gloucester
KQH	*s.s.* Howard
KQI	*s.s.* Indian
KQJ	*s.s.* Juniata
KQK	*s.s.* Kershaw
KQL	*s.s.* Lexington
KQM	*s.s.* Merrimack
KQN	*s.s.* Nantucket
KQO	*s.s.* Ontario
KQP	*s.s.* Parthian
KQQ	*s.s.* Quantico
KQR	*s.s.* Grecian
KQS	*s.s.* Somerset
KQT	*s.s.* Tuscan
KQX	*s.s.* Persian
KQY	*s.s.* Powhatan
KQZ	*s.s.* Suwannee
KRB	*s.s.* Governor Cobb
KRC	*s.s.* Camden
KRD	*s.s.* Belfast

KRE	s.s. Bay State
KRF	s.s. Ransom B. Fuller
KRH	s.s. City of Bangor
KRI	s.s. City of Rockland
KRJ	s.s. Relief
KRL	s.s. Louise
KRN	s.s. Calvin Austin
KRO	s.s. Columbia
KRP	s.s. Rescue
KRQ	s.s. I. J. Merritt
KRR	s.s. Mills
KRS	s.s. Savage
KRV	s.s. Governor Dingley
KRY	s.s. City of Baltimore
KRZ	s.s. City of Norfolk
KSF	s.s. Finland
KSH	s.s. Kroonland
KSL	s.s. St. Louis
KSM	s.s. Philadelphia
KSN	s.s. New York
KSO	s.s. St. Paul
KSV	s.s. City of Richmond
KSW	s.s. City of Annapolis
KSX	s.s. Alabama
KSY	s.s. Florida
KSZ	s.s. Virginia
KTA	s.s. Larimer
KTC	barge Shenango
KTD	s.s. Ligonier
KTE	s.s. Winifred
KTF	s.s. J. M. Guffey
KTG	s.s. Guefoil
KTH	s.s. Illinois
KTI	s.s. Brilliant
KTJ	s.s. Comet
KTK	s.s. John D. Archibald
KTK	s.s. Segundo (El.)
KTL	s.s. Rayo
KTN	s.s. Perfection
KTP	s.s. S.O. Co. No. 94
KTR	s.s. Radiant
KTS	s.s. Vesta
KTT	s.s. Paraguay
KTU	s.s. Sun
KTV	s.s. Toledo
KTW	s.s. Delaware Sun
KTX	s.s. Socony
KTY	s.s. S.O. Co. No. 92
KUP	barge Pettibone
KUT	s.s. Pan American
KUV	s.s. Admiral Dewey
KUX	s.s. Admiral Schley
KVA	s.s. Apache
KVB	s.s. Arapahoc
KVC	s.s. Comanche
KVF	s.s. Iroquois
KVG	s.s. Algonquin
KVH	s.s. Huron
KVJ	s.s. Seminole
KVK	s.s. Cherokee
KVL	s.s. Lenape
KVM	s.s. Mohawk
KVU	s.s. Elmer A. Keeler
KVZ	c.s. Relay
KWC	s.s. Morro Castle
KWG	s.s. Seguranca
KWH	s.s. Havana
KWK	tug W. B. Keene
KWS	s.s. Saratoga
KWV	s s. Vigilancia
KWX	s.s. Mexico
KWY	s.s. Monterey
KWZ	s.s. Esperanza
KXA	s.s. Boston
KXB	s.s. City of Lowell
KXC	s.s. Commonwealth
KXD	s.s. Maine
KXE	s.s. Mohawk
KXF	s.s. New Hampshire
KXG	s.s. Pilgrim
KXH	s.s. Plymouth
KXI	s.s. Priscilla
KXJ	s.s. Providence
KXK	s s. Puritan
KXL	s.s. City of Taunton
KXM	s.s. Mohegan
KXN	s.s. New Haven
KXO	s.s. Connecticut
KXP	s.s. Pequonnock
KXQ	s.s. Chester W. Chapin
KXR	s.s. Richard Peck
KYA	s.y. Atalanta
KYB	s.y. North Wind
KYC	s.y. Corsair
KYD	s.y. Cyprus
KYE	s.y. Cassandra
KYF	s.y. Florence
KYG	s.s. Wild Duck
KYH	s.y. Aloha
KYI	s.y. Wakira
KYK	s.y. Kismet
KYL	s.y. Lysistrata
KYM	s.y. Columbia
KYN	s.y. Niagara
KYO	s.y. Noma
KYP	s.y. Oneida
KYR	s.y. Karina
KYS	s.y. Sea Otter
KYT	s.y. Vanadis
KYV	s.y. Adventuress
KYW	s.y. Warrior
KYX	s.y. Wana
LAA	w.s. Eidsvold
LAB	w.s. Harald Haarfagre
LAC	w.s. Norge
LAD	w.s. Tordenskjold
LAE	w.s. Frithjof
LAF	w.s. Viking
LAG	w.s. Ellida
LAH	w.s. Tyr
LAI	w.s. Drauge
LAJ	w.s. Troll
LAK	w.s. Valkyrien
LAL	w.s. Sael
LAM	w.s. Skrei
LAN	w.s. Hval
LAO	w.s. Trods
LAP	w.s. Lom
LAQ	w.s. Jo
LAR	w.s. Skarv
LAS	w.s. Teist
LAT	w.s. Kjell
LAU	A 1
LAV	A 2
LAW	A 3
LAX	A 4

LAY	A 5
LAZ	*w.s.* Heimdal
LBA	*w.s.* Nidaross
LBB	*w.s.* Björgvin
LBC	*w.s.* Garm
LBZ	Karljohansvern
LCA	*s.s.* Hektoria
LCB	*s.s.* Ronald
LDA	*s.s.* Bessheim
LDB	*s.s.* Sterling
LDD	*s.s.* Commonwealth
LDE	*s.s.* Karrakatta
LDF	Flekkerö
LDG	*s.s.* Norvega
LDH	*s.s.* Mexicano
LDI	*s.s.* Klem
LDJ	*s.s.* Ragnvald Jarl
LDK	*s.s.* Kong Harald
LDL	*s.s.* Haakon VII.
LDO	*s.s.* Venus
LDP	*s.s.* Vega
LDQ	*s.s.* Irma
LDR	*s.s.* Zeta
LDV	*s.s.* Örn II.
LDZ	*s.s.* Borgestad
LEA	*s.s.* Correct
LEB	*s.s.* Obidense
LEC	*s.s.* Svend Foyn I.
LEI	Ingö Radio
LEJ	*s.s.* City of Mexico
LEN	Sörvaagen
LET	Tjömö
LFB	*s.s.* Bergensfjord
LFG	Spitzbergen
LFK	*s.s.* Kristianiafjord
LFR	Röst
LGN	Bergen Radio
LIA	Darsena Norte
LIB	Rio Santiago, Buenos Aires
LIC	Faro Mogotes
LID	Faro Recalada
LIE	Puerto Militar
LIF	Cabo de las Virgenes
LIG	Año Nuevo
LIH	Ushuaia
LII	Paz, Entre Rios (La)
LIJ	Formosa Argentina
LIK	Dársena Sud
LIL	Campo Mayo
LIM	Mendoza
LIN	M. Guerra
LKA	*w.s.* Almirante Brown
LKB	*w.s.* Belgrano
LKC	*w.s.* Buenos Aires
LKD	*w.s.* Catamarca
LKE	*w.s.* Chaco
LKF	*w.s.* Cordoba
LKG	*w.s.* Plata (El)
LKH	*w.s.* Entre Rios
LKI	*w.s.* Espora
LKJ	*w.s.* Fragata Sarmiento
LKK	*w.s.* Garibaldi
LKL	*w.s.* Gaviota
LKM	*w.s.* Guardia Nacional
LKN	*w.s.* Independencia
LKO	*w.s.* Injury
LKP	*w.s.* Plata (La)
LKQ	*w.s.* Libertad
LKR	*w.s.* Andes (Los)
LKS	*w.s.* Maipu
LKT	*w.s.* Moreno
LKU	*w.s.* 9 De Julio
LKV	*w.s.* Pampa
LKW	*w.s.* Parana
LKX	*w.s.* Patagonia
LKY	*w.s.* Patria
LKZ	*w.s.* Piedrabuena
LLA	*w.s.* 1° de Mayo
LLB	*w.s.* Pueyrrèdon
LLC	*w.s.* Rivadavia
LLD	*w.s.* Rosario
LLE	*w.s.* S. Martin
LLF	*w.s.* Uruguay
LLG	*w.s.* 25 de Mayo
LLH	*g.s.* Draga 209
LLI	*g.s.* Draga 210
LLJ	*g.s.* Draga 211
LLK	*g.s.* Pampero
LLL	*g.s.* Vapor 118B
LLM	*s.s.* Berlin
LLN	*s.s.* Berna
LLO	*s.s.* Bruselas
LLP	*s.s.* Buenos Aires
LLQ	*s.s.* Colonia
LLR	*s.s.* Eolo
LLS	*s.s.* Guarany
LLT	*s.s.* Helios
LLU	*s.s.* Labrador
LLV	*s.s.* Lambare
LLW	*s.s.* Londres
LLX	*s.s.* Luna
LLY	*s.s.* Madrid
LLZ	*s.s.* Paris
LMA	*s.s.* Roma
LMB	*s.s.* Triton
LMC	*s.s.* Venus
LMD	*s.s.* Viena
LME	*s.s.* Camarones
LMF	*s.s.* Mendoza
LMG	*s.s.* Presidente Mitre
LMH	*s.s.* Presidente Quintana
LMI	*s.s.* Rio de la Plata
LMJ	*s.s.* Rio Uruguay
LMK	*s.s.* Avellaneda
LML	*s.s.* Rawson
LMM	*s.s.* Rivadavia
LMM	*s.s.* S. Martin
LMN	*s.s.* Cabo Santa Maria
LMO	*s.s.* Cabo Corrientes
LMP	*s.s.* Toro
MAA	*s.s.* Carmania
MAB	*s.s.* Kandahar
MAC	*s.s.* San Gregoria
MAD	*s.s.* Musician
MAE	*s.s.* Swanmore
MAF	*s.s.* Karema
MAG	*s.s.* City of Chester
MAH	*s.s.* Star of Australia
MAI	*s.s.* Caledonia
MAJ	*s.s.* Calabria
MAK	*s.s.* Star of England
MAL	*s.s.* Star of Victoria
MAM	*s.s.* Matoppo
MAN	*s.s.* San Dunstano
MAO	*s.s.* San Tirso
MAP	*s.s.* Botanist

MAQ	s.s. Bolton Castle	MDI	s.s. Pancras
MAR	s.s. Italia	MDJ	s.s. Stephen
MAS	s.s. Pectan	MDK	s.s. Anselm
MAT	s.s. Invertay	MDL	s.s. Devonian
MAU	s.s. Cardiganshire	MDM	s.s. Hildebrand
MAV	s.s. Swazi	MDN	s.s. Sardinian
MAW	s.s. Perugia	MDO	s.s. Highland Harris
MAX	Broomfield	MDP	s.s. Hilary
MAY	s.s. Antony	MDQ	s.s. New Londoner
MAZ	s.s. Aronda	MDR	s.s. Ambrose
MBA	s.s. Athenia	MDS	s.s. Lanfranc
MBB	s.s. Asturias	MDT	s.s. Caledonian
MBC	s.s. Baltic	MDU	s.s. Atahualpha
MBD	s.s. Bermudian	MDV	s.s. Huayna
MBE	s.s. Nairnshire	MDY	s.s. Stephano
MBF	s.s. Saturnia	MDZ	s.s. Arundel
MBG	s.s. Araguaya	MEA	s.s. Franconia
MBH	s.s. Guiana	MEC	s.s. Narragansett
MBI	s.s. Korona	MED	s.s. Cassandra
MBJ	s.s. Tritonia	MEE	s.s. Electra
MBK	s.s. Parima	MEF	s.s. John Pender
MBL	s.s. Principello	MEG	s.s. Norseman
MBM	s.s. Danube	MEH	s.s. Magnet
MBN	s.s. Aragon	MEI	s.s. Iroquois
MBO	s.s. Avon	MEJ	s.s. Recorder
MBP	s.s. Lancastrian	MEK	s.s. Highland Heather
MBQ	s.s. Ben-my-Chree	MEL	s.s. Bohemian
MBR	s.s. San Ricardo	MEM	s.s. Patrol
MBS	s.s. Persia	MEN	s.y. Navahoe
MBT	s.s. Rimutaka	MEO	s.s. Highland Hope
MBU	s.s. Marere	MEP	s.s. Highland Laird
MBV	s.s. Chignecto	MEQ	s.s. Empress Queen
MBW	s.s. Maryland	MER	s.s. Highland Watch
MBZ	s.s. Amazon	MES	s.s. Raeburn
MCA	s.s. Campania	MET	s.s. Raphael
MCB	s.s. Nerehana	MEU	s.s. Rembrandt
MCC	s.s. San Urbano	MEV	s.s. Romney
MCD	c.s. Viking	MEW	s.s. Nellore
MCE	s.s. Khyber	MEY	s.s. Rossetti
MCF	s.s. Canada	MEZ	s.s. Glenetive
MCG	c.s. Cambria	MFA	s.s. Lusitania
MCG	Mocanquê	MFB	s.s. Sentinel
MCH	s.s. Bandra	MFC	s.s. Arabic
MCI	s.s. California	MFD	s.s. Etonian
MCJ	s.s. Telconia	MFE	s.s. Mantaro
MCK	s.y. Catania	MFE	s.s. City of Corinth
MCL	s.s. Colonia	MFF	s.s. Pachitea
MCM	s.s. Princess Victoria	MFF	s.s. Berrima
MCN	s.s. Corsican	MFG	s.s. Urubamba
MCO	s.s. Llandovery Castle	MFG	s.s. Kumara
MCP	s.s. Ceramic	MFH	s.s. Columbia
MCQ	s.s. Munster	MFI	s.s. Georgian
MCR	s.s. Indus	MFJ	s.s. Cormorant
MCS	s.s. Snaefell	MFK	s.s. Sherard Osborn
MCT	s.s. Buccaneer	MFL	s.s. Winifredian
MCU	s.s. Connaught	MFM	s.s. Aidan
MCV	s.s. Leinster	MFN	s.s. Pretorian
MCW	s.s. Ulster	MFO	s.s. Engineer
MCY	s.s. City of Madras	MFP	s.s. Keelung
MCZ	s.s. Highland Brigade	MFQ	s.s. Borda
MDA	s.s. Highland Enterprise	MFR	s.s. Mayaro
MDB	s.s. Clement	MFS	s.s. Banca
MDC	s.s. Cedric	MFT	Clifden
MDD	s.s. Christopher	MFU	s.s. Aeneas
MDE	s.s. Denis	MFV	s.s. Ascanius
MDF	s.s. Dominion	MFW	s.s. Anchises
MDG	s.s. Francis	MFZ	s.s. Maracas
MDH	s.s. Hubert	MGA	s.s. Mauretania

MGB	*s.s.* Pera
MGC	*s.s.* Cymric
MGD	*s.s.* Baron Jedburgh
MGE	*s.s.* Bardolph
MGF	*s.s.* Miltiades
MGG	*s.s.* Moravian
MGH	*s.s.* Norseman
MGI	*s.s.* Orbita
MGJ	*s.s.* Marathon
MGK	*s.s.* Demosthenes
MGL	*s.s.* Canadian
MGM	*s.s.* Themistocles
MGN	*s.s.* Virginian
MGO	*s.s.* Orca
MGP	*s.s.* Orduna
MGQ	*s.s.* Kelvinia
MGR	*s.s.* Hatumet
MGS	*s.s.* Caliban
MGT	*s.s.* British Sun
MGU	*s.s.* Campanello
MGV	*s.s.* Monmouth
MGW	*s.s.* Colonian
MGY	*s.s.* Filey
MGZ	*s.s.* Khiva
MHA	*s.s.* Iberian
MHB	*s.s.* Indian
MHC	*s.s.* Adriatic
MHD	*s.s.* Toro (El)
MHE	*s.s.* Zorro (El)
MHF	*s.s.* Baron Erskine
MHG	*s.s.* Carpentaria
MHH	Haven, The (Poole)
MHI	*s.s.* Olympia
MHJ	*s.s.* Scindia
MHK	*s.y.* Sapphire
MHL	*s.s.* Cestrian
MHM	*s.s.* Kingstonian
MHN	*s.s.* Carthaginian
MHO	*s.s.* Cordobes (El)
MHP	*s.s.* Statesman
MHQ	*s.s.* Massilia
MHR	*s.s.* Oxonian
MHS	*s.s.* Bempton
MHT	*s.s.* Historian
MHU	*s.s.* Limerick
MHV	*s.s.* Crown of Toledo
MHW	*s.y.* Alberta
MHY	*s.s.* Paparoa
MHZ	*s.s.* San Valerio
MIA	*s.s.* Ivernia
MIB	*s.s.* San Francisco
MIC	*s.s.* Laurentic
MID	*s.s.* Inanda
MIE	*s.s.* Corcovado
MIF	*s.s.* Inca
MIG	*w.s.* Minas Geraes
MIH	*s.s.* Magellan
MII	*s.s.* Potosi
MIJ	*s.s.* Sorata
MIK	*s.s.* Inkosi
MIL	*s.s.* Palermo
MIN	*s.s.* Ionian
MIO	*s.s.* Cameronia
MIP	*s.s.* Intaba
MIQ	*s.s.* Peshawur
MIR	*s.s.* Patrician
MIS	*s.s.* Brodstone
MIT	*s.s.* Geénesee
MIU	*s.s.* Andorinha
MIV	*s.s.* Ottawa
MIW	*s.s.* Somali
MIY	*s.s.* Suwanee
MIZ	*s.s.* San Hilario
MJA	*s.s.* Oropesa
MJC	*s.s.* Suevic
MJD	*s.s.* Niwaru
MJE	*s.s.* Orissa
MJF	*s.s.* Orcoma
MJG	*s.s.* Onrita
MJH	*s.s.* Haverford
MJI	*s.s.* Oronsa
MJJ	*s.s.* Oriana
MJK	*s.s.* Ortega
MJL	*s.s.* Antillian
MJM	*s.s.* Merion
MJN	*s.s.* Scotian
MJO	*s.s.* San Isidoro
MJP	*s.s.* San Jeronimo
MJQ	*s.s.* Westmeath
MJR	*s.s.* Arcadian
MJS	*s.s.* Baron Napier
MJT	*s.s.* Llanstephen Castle
MJU	*s.s.* Calgarian
MJV	*s.s.* San Eduardo
MJW	*s.s.* Alcala
MJY	*s.s.* Vandyck
MJZ	*s.s.* Vestris
MKA	*s.s.* Ruahine
MKB	*s.s.* Ruapehu
MKC	*s.s.* Olympic
MKD	*s.s.* Palma
MKE	*s.s.* Rotorua
MKF	*s.s.* Muritai
MKG	*s.s.* Delta
MKH	*s.s.* Mimiro
MKI	*s.s.* Linnet
MKJ	*s.s.* Turakina
MKK	*s.s.* Medic
MKL	*s.s.* Asian
MKM	*s.s.* Maloja
MKN	*s.s.* Corinthian
MKO	*s.s.* Chinkoa
MKP	*s.s.* Medina
MKQ	*s.s.* Ballarat
MKR	*s.s.* Beltana
MKS	*s.s.* Moto
MKT	*s.s.* Eupion
MKU	*s.s.* Aranmore
MKV	*s.s.* Remuera
MKW	*s.s.* Great City
MKY	*s.s.* Sarnia
MKZ	*s.s.* Ascot
MLA	*s.s.* Minnie de Larrinaga
MLB	*s.s.* Aracataca
MLC	*s.s.* Celtic
MLD	*s.s.* Ranger
MLE	*s.s.* Tyrolia
MLF	*s.s.* Milwaukee
MLG	*s.s.* Missouri
MLH	*s.s.* Lake Michigan
MLI	*s.s.* Montreal
MLJ	*s.s.* Montrose
MLK	*s.s.* Montezuma
MLL	*s.s.* Barranca
MLM	*s.s.* Lake Manitoba
MLN	*s.s.* Ruthenia

MLO	s.s. Mount Royal
MLP	s.s. Chirripo
MLQ	s.s. Mount Temple
MLR	s.s. Manistee
MLS	s.s. Manzanares
MLT	s.s. Matina
MLU	s.s. Miami
MLV	s.s. Nicoya
MLW	s.s. Montfort
MLY	s.s. Pacuare
MLZ	s.s. Montcalm
MMA	s.s. Minnehaha
MMB	s.s. Mackay-Bennett
MMD	s.s. Malwa
MME	s.s. Mantua
MMF	s.s. Morea
MMG	s.s. Egypt
MMH	s.s. Moldavia
MMI	s.s. Reventazon
MMJ	s.s. Mongolia
MMK	s.s. Minnetonka
MML	s.s. Macedonia
MMM	s.s. Mooltan
MMN	s.s. Minneapolis
MMO	s.s. Tortuguero
MMP	s.s. Zent
MMQ	s.s. Persia
MMR	s.s. Marmora
MMS	s.s. Colorado
MMT	s.s. Salsette
MMU	s.s. China
MMV	s.s. Mesaba
MMW	s.s. Minnewaska
MMY	s.s. India
MMZ	s.s. Arabia
MNA	s.s. Pannonia
MNB	s.s. Soudan
MNC	s.s. Scandinavian
MND	s.s. San Lorenzo
MNE	s.s. Menominee
MNF	s.s. Tokomaru
MNG	s.s. Digby
MNH	s.s. Dongola
MNI	s.s. Kastalia
MNJ	s.s. Plassy
MNK	s.s. Marina
MNL	s.s. Kanawha
MNM	s.s. Manitou
MNN	s.s. Numidian
MNO	s.s. Rappahannock
MNP	s.s. Shenandoah
MNQ	s.s. Marquette
MNR	s.s. Anglian
MNS	s.s. Parthenia
MNT	s.s. Cambrian
MNU	s.s. Caledonia
MNV	s.s. Columbian
MNW	s.s. Philadelphian
MNY	s.s. Himalaya
MOA	s.s. Mutlah
MOB	s.s. Cetriania
MOC	s.s. Oceanic
MOD	s.s. Otranto
MOE	s.s. Benefactor
MOF	s.s. Orsova
MOG	s.s. Michigan
MOH	s.s. Otway
MOI	s.s. Columbia
MOJ	s.s. Orvieto
MOK	s.s. Omrah
MOL	s.s. Sachem
MOM	s.s. Norman
MON	s.s. Mongolian
MOO	s.s. Assaye
MOP	s.s. Kent
MOQ	s.s. Banffshire
MOR	s.s. Takada
MOS	s.s. Waimate
MOT	s.s. Indrabarrah
MOU	s.s. Devanha
MOV	s.s. Brighton
MOW	s.s. Carisbrook Castle
MOY	s.s. Osterley
MOZ	s.s. Orontes
MPA	s.s. Carpathia
MPB	s.s. Empress of Britain
MPC	s.s. Canopic
MPD	Poldhu
MPE	s.s. King Orry
MPF	s.s. Monteagle
MPG	s.s. Denbighshire
MPH	s.s. Candia
MPI	s.s. Empress of India
MPJ	s.s. Empress of Japan
MPK	s.s. San Wilfrido
MPL	s.s. Empress of Ireland
MPM	s.s. Changuinola
MPN	s.s. Motagua
MPO	s.s. Cassio
MPP	s.s. Melania
MPQ	s.s. Dunvegan Castle
MPR	s.s. Barpeta
MPS	s.s. San Zeferino
MPT	s.s. Sagamore
MPU	s.s. Den of Ogil
MPV	s.s. Pathan
MPW	s.s. Balmoral Castle
MPY	s.s. Galway Castle
MPZ	s.s. Guildford Castle
MQA	s.s. Rohilla
MQB	s.s. Rewa
MQC	s.s. Persic
MQD	s.s. Caraquet
MQE	s.s. Edinburgh Castle
MQF	s.s. Kenilworth Castle
MQG	s.s. Armadale Castle
MQH	s.s. Walmer Castle
MQI	s.s. Saxon
MQJ	s.s. Briton
MQK	s.s. Kildonan Castle
MQL	s.s. Kinfauns Castle
MQM	s.s. Dover Castle
MQN	s.s. Durham Castle
MQO	s.s. Dunluce Castle
MQP	s.s. Garth Castle
MQQ	s.s. Grantully Castle
MQR	s.s. Galeka
MQS	s.s. German
MQT	s.s. Galician
MQU	s.s. Gaika
MQV	s.s. Gascon
MQW	s.s. Goorkha
MQY	s.s. Cobequid
MQZ	s.s. Gloucester Castle
MRA	s.s. Caronia
MRB	s.s. Brodvale

MRC	s.s. Cretic	MYC	s.s. Afric
MRD	s.s. Empress of Russia	MYE	s.s. Oxfordshire
MRE	s.s. Knight Bachelor	MYG	s.s. Gloucestershire
MRF	s.s. Hororata	MYH	s.s. Clearway
MRG	s.s. Opawa	MYL	s.s. Leicestershire
MRH	s.s. Elysia	MYM	s.s. Worcestershire
MRI	s.s. Whakatane	MYN	s.s. Tahiti
MRJ	s.s. Horley	MYO	s.s. Warwickshire
MRK	s.s. Scotia	MYR	s.s. Armenian
MRL	s.s. Dieppe	MYY	s.s. Victorian
MRM	s.s. Orari	MZC	s.s. Megantic
MRN	s.s. Grampian	MZE	s.s. Akabo
MRO	s.s. Rakia	MZF	s.s. Nigeria
MRP	s.s. Otaki	MZI	s.s. Elmina
MRQ	s.s. Andes	MZJ	s.s. Karina
MRR	s.s. Alcantara	MZK	s.s. Falaba
MRS	s.s. Kaikoura	MZL	s.s. Florizel
MRT	s.s. Kafue	MZM	s.s. Mendi
MRU	s.s. Roebuck	MZR	s.s. Carnarvonshire
MRV	s.s. Waiwera	MZT	s.s. Tarquah
MRW	s.s. Kansas	MZU	s.s. Burutu
MRY	s.s. Sandon Hall	MZX	Chelmsford
MSA	s.s. Saxonia	NAA	Arlington (Va.)
MSG	s.s. Ucayali	NAB	Portland (Me.)
MSN	s.s. Hesperian	NAC	Portsmouth (New Hampshire)
MST	w.s. Matto Grosso	NAD	Boston NAD
MSZ	s.s. Caesarea	NAE	Cape Cod
MTA	s.s. Ultonia	NAF	Newport (Rhode Island)
MTC	s.s. Teutonic	NAG	Fire Island
MTH	s.s. Walton Hall	NAH	New York NAH
MTI	s.s. Negra (La)	NAI	Philadelphia NAI
MTN	s.s. Tunisian	NAK	Annapolis (Maryland)
MTR	s.s. Ansonia	NAL	Washington NAL
MTS	s.s. Star of Scotland	NAM	Norfolk (Va.)
MTU	s.s. Ascania	NAN	Beaufort (Nth. Carolina)
MTW	s.s. Orama	NAO	Charleston (Sth. Carolina)
MUN	s.s. Sicilian	NAP	Saint Augustine (Ha.)
MUZ	s.s. Zealandic	NAQ	Jupiter
MVA	s.s. Norman Bridge	NAR	Key West (Ha.)
MVC	s.s. Sussex	NAS	Pensacola (Ha.)
MVJ	s.s. Erinpura	NAT	New Orleans
MVK	s.y. Viking (The)	NAU	San Juan de Puerto Rico
MVL	s.s. Atlantian	NAW	Guantanamo Bay
MVN	s.s. Victorian	NAX	Colon
MVP	s.s. Viking	NAY	Porto Bello (Panama)
MVW	s.s. Patia	NBH	w.s. Ajax
MWA	s.s. Aaro	NBI	w.s. Alabama
MWB	s.s. Panama	NBJ	w.s. Albany
MWC	s.s. Runic	NBL	w.s. Alert
MWD	s.s. Victoria	NBP	w.s. Ammen
MWE	s.s. Arawa	NBR	w.s. Annapolis
MWF	s.s. Tainui	NBU	w.s. Buffalo
MWG	s.s. Mexico	NBV	w.s. Arkansas
MWH	s.s. California	NCF	w.s. Bailey
MWI	s.s. Ionic	NCH	w.s. Baltimore
MWJ	s.s. Mersey	NCL	w.s. Beale
MWK	s.s. Quillota	NCM	w.s. Birmingham
MWL	s.s. Californian	NCV	w.s. Burrows
MWM	s.s. Guatemala	NCY	w.s. Caesar
MWN	s.s. Athenic	NCZ	w.s. California
MWO	s.s. Oslo	NDA	w.s. Castine
MWS	s.s. Huallaga	NDB	w.s. Celtic
MWT	s.s. Corinthic	NDD	w.s. Galveston
MWU	s.s. Uranium	NDG	w.s. Chester
MWY	s.s. Circassia	NDH	w.s. Cheyenne
MWZ	s.s. Castalia	NDI	s.s. Chicago
MYA	s.s. Herefordshire	NDL	w.s. Cincinnati
MYB	s.s. Derbyshire	NDM	w.s. Cleveland

NDN	*w.s.* Colorado
NDQ	*w.s.* Connecticut
NDU	*w.s.* Culgoa
NDY	*w.s.* Cyclops
NEK	*w.s.* Deleware
NEM	*w.s.* Denver
NEN	*w.s.* Des Moines
NEP	*w.s.* Dixie
NEQ	*w.s.* Dolphin
NER	*w.s.* Don Juan de Austria
NES	*w.s.* Dorothea
NET	*w.s.* Drayton
NEU	*w.s.* Dubuque
NFC	*w.s.* Eagle
NFD	*w.s.* Elcano
NFE	*w.s.* Charleston
NFJ	*w.s.* Essex
NFM	*w.s.* Fannang
NFR	*w.s.* Florida
NFS	*w.s.* Flusser
NGF	*w.s.* Georgia
NGH	*w.s.* Glacier
NGI	*w.s.* Gloucester
NGJ	*w.s.* Goldsborough
NGK	*w.s.* Gopher
NGU	*w.s.* Hannibal
NGX	*w.s.* Hector
NGY	*w.s.* Helenor
NHA	*w.s.* Henley
NHC	*w.s.* Hopkins
NHE	*w.s.* Hull
NHN	*w.s.* Idaho
NHO	*w.s.* Illinois
NHQ	*w.s.* Indiana
NHT	*w.s.* Iowa
NHU	*w.s.* Iris
NHV	*w.s.* Iroquois
NIB	*w.s.* Jarvis
NID	*w.s.* Jenkins
NIE	*w.s.* Jouett
NIO	*w.s.* Kansas
NIP	*w.s.* Kearsarge
NIQ	*w.s.* Kentucky
NIW	*w.s.* Lamson
NIY	*w.s.* Lawrence
NIZ	*w.s.* Lebenon
NJB	*w.s.* Louisiana
NJH	*w.s.* Macdonough
NJI	*w.s.* Machias
NJL	*w.s.* Maine
NJO	*w.s.* Marblehead
NJQ	*w.s.* Marietta
NJR	*w.s.* Mars
NJS	*w.s.* Maryland
NJT	*w.s.* Massachusetts
NJU	*w.s.* Mayrunt
NJV	*w.s.* Mayflower
NJW	*w.s.* McCall
NJZ	*w.s.* Michigan
NKD	*w.s.* Minnesota
NKE	*w.s.* Mississippi
NKF	*w.s.* Missouri
NKJ	*w.s.* Monadnock
NKL	*w.s.* Monaghan
NKM	*w.s.* Montana
NKN	*w.s.* Monterey
NKO	*w.s.* Montgomery
NKY	*w.s.* Nashville

NKZ	*w.s.* Navajo
NLA	Nantucket Shoals Lightship
NLB	Diamond Shoals Lightship
NLC	Frying Pan Shoals Lightship
NLF	*w.s.* Kukui
NLH	*w.s.* Patterson
NLI	*w.s.* Explorer
NMA	*w.s.* Nebraska
NMB	*w.s.* Nero
NME	*w.s.* New Hampshire
NMF	*w.s.* New Jersey
NMG	*w.s.* New Orleans
NMN	*w.s.* North Carolina
NMO	*w.s.* North Dakota
NMS	*w.s.* Neptune
NMW	*w.s.* Ohio
NMZ	*w.s.* Oregon
NNA	*w.s.* Brutus
NNK	*w.s.* Nanshan
NOA	*w.s.* Osceola
NOB	*w.s.* Abarenda
NOC	*w.s.* Orion
NOG	*w.s.* Paduca
NOJ	*w.s.* Panther
NOK	*w.s.* Patterson
NOL	*w.s.* Patapsco
NOM	*w.s.* Patuxent
NON	*w.s.* Paulding
NOP	*w.s.* Paul Jones
NOT	*w.s.* Pittsburg
NOW	*w.s.* Peoria
NOX	*w.s.* Perkins
NOY	*w.s.* Perry
NOZ	*w.s.* Petrel
NPA	Cordova, Alaska
NPB	Sitka
NPC	Bremerton
NPD	Tatoosh
NPE	North Head
NPF	Cape Blanco
NPH	Mare Island
NPI	Farallons
NPJ	Balboa
NPK	Point Arguello
NPL	San Diego (Cal.)
NPM	Honolulu
NPN	Guam
NPO	Cavite
NPP	Peking
NPQ	St. Paul, Alaska
NPR	Dutch Harbor
NPS	Kodiak
NPT	Olongapo
NPV	Unalga
NPW	Eureka (Cal.)
NPY	St. George, Alaska
NQF	*w.s.* Pompey
NQK	*w.s.* Potomac
NQM	*w.s.* Prairie
NQN	*w.s.* Preble
NQO	*w.s.* Preston
NQP	*w.s.* Princeton
NQR	*w.s.* Prometheus
NRA	*g.s.* Algonquin
NRB	*g.s.* Bear
NRC	*g.s.* Morrill
NRD	*g.s.* Androscoggin

NRE	*g.s.* Seneca
NRF	*g.s.* Snohomish
NRG	*g.s.* Gresham
NRH	*g.s.* McCulloch
NRI	*g.s.* Itasca
NRJ	*g.s.* Woodbury
NRK	*g.s.* Tahoma
NRL	*g.s.* Tuscarora
NRM	*g.s.* Melhawk
NRN	*g.s.* Manning
NRO	*g.s.* Onondaga
NRP	*g.s.* Appache
NRQ	*g.s.* Miami
NRR	*g.s.* Pamlico
NRS	*g.s.* Seminole
NRT	*g.s.* Thetis
NRU	*g.s.* Acushnet
NRV	*g.s.* Winona
NRW	*g.s.* Windon
NRX	*g.s.* Unalgai
NRY	*g.s.* Yamacraw
NSQ	*w.s.* Smith
NST	*w.s.* Solace
NSW	*w.s.* South Carolina
NSX	*w.s.* South Dakota
NTA	*w.s.* Ontario
NTB	*w.s.* Sterrett
NTC	*w.s.* Stewart
NTD	*w.s.* Rainbow
NTE	*w.s.* Raleigh
NTF	*w.s.* S. Louis
NTG	*w.s.* Sonoma
NTI	*w.s.* Stringham
NTK	*w.s.* Supply
NTL	*w.s.* Sylph
NTP	*w.s.* Salem
NTQ	*w.s.* San Francisco
NTR	*w.s.* Saratoga
NTT	*w.s.* Scorpion
NTU	*w.s.* Reid
NTX	*w.s.* Rhode Island
NTZ	*w.s.* Roe
NUA	*w.s.* Tacoma
NUC	*w.s.* Tallahassee
NUG	*w.s.* Tennessee
NUI	*w.s.* Terry
NUN	*w.s.* Tonopah
NUQ	*w.s.* Trippe
NUS	*w.s.* Truxton
NVE	*w.s.* Utah
NVK	*w.s.* Vermont
NVM	*w.s.* Vesuvius
NVN	*w.s.* Vicksburg
NVP	*w.s.* Villalobas
NVR	*w.s.* Virginia
NVS	*w.s.* Vixen
NVT	*w.s.* Vulcan
NWD	*w.s.* Warrington
NWE	*w.s.* Washington
NWG	*w.s.* West Virginia
NWH	*w.s.* Wheeling
NWI	*w.s.* Whipple
NWK	*w.s.* Wilmington
NWL	*w.s.* Walke
NWM	*w.s.* Wisconsin
NWN	*w.s.* Wolverine
NWQ	*w.s.* Wyoming
NXC	*w.s.* Yantic
NXS	*w.s.* EI
NXT	*w.s.* EII.
NZZ	*g.s.* Tarragon
OHB	Sebenico
OHC	Castelnuovo
OHP	Pola
OHT	Triest
OKA	*s.s.* Atlanta
OKB	*s.s.* Belvedere
OKC	*s.s.* Columbia
OKE	*s.s.* Eugenia
OKF	*s.s.* Francesca
OKG	*s.s.* Argentina
OKH	*s.s.* Sofia Hohenberg
OKI	*s.s.* Alice
OKK	*s.s.* Kaiser Franz Joseph I.
OKL	*s.s.* Laura
OKM	*s.s.* Martha Washington
OKO	*s.s.* Oceania
OLA	*s.s.* Africa
OLB	*s.s.* Bohemia
OLC	*s.s.* China
OLE	*s.s.* Erzherzog Franz Ferdinand
OLG	*s.s.* Gablonz
OLH	*s.s.* Helouan
OLI	*s.s.* Thalia
OLJ	*s.s.* Silesia
OLK	*s.s.* Körber
OLL	*s.s.* Cleopatra
OLM	*s.s.* Marienbad
OLN	*s.s.* Nippon
OLP	*s.s.* Persia
OLR	*s.s.* Habsburg
OLS	*s.s.* Semiramis
OLT	*s.s.* Trieste
OLU	*s.s.* Austria
OLV	*s.s.* Vorwärts
OLW	*s.s.* Wien
OMA	*s.s.* Mercedes II
ONA	Banana
ONE	*t.s.* Avenir (L')
ONJ	*g.s.* Jan Breydel
ONM	*g.s.* Marie-Henriette
ONV	*s.s.* Anversville
OPA	*g.s.* Stad Antwerpen
OPC	*g.s.* Princesse Clémentine
OPD	*g.s.* Léopold II.
OPE	*g.s.* Princesse Elisabeth
OPH	*g.s.* Princesse Henriette
OPJ	*g.s.* Princesse Joséphine
OPK	*g.s.* Pieter de Coninck
OPR	*g.s.* Radide (Le)
OPV	*s.s.* Léopoldville
OQB	Boma
OQC	Coquilhatville
OQD	Kindu
OQG	Kongolo
OQH	Elisabethville
OQI	Lisala
OQK	Kikondja
OQL	Léopoldville
OQO	Basoko
OQR	Antwerp (Quai du Rhin)
OQS	Stanleyville
ORD	*s.s.* Vaderland
ORG	*s.s.* Gothland
ORL	*s.s.* Lapland

ORS	*s.s.* Samland
ORZ	*s.s.* Zeeland
OST	Nieuport
OSV	*s.s.* Elisabethville
OSY	*s.y.* Leda
OTV	*s.s.* Albertville
OUA	*w.s.* Absalon
OUD	*w.s.* Dannebrog
OUF	*w.s.* Olfert Fischer
OUG	*w.s.* Gejser
OUH	*w.s.* Herluf Trolle
OUI	*w.s.* Islands Falk
OUJ	*w.s.* Hejmdal
OUL	*w.s.* Lossen
OUN	*g.s.* Lövenörn
OUO	*g.s.* C. F. Grove
OUP	*w.s.* Peder Skram
OUS	*w.s.* Skjold
OUV	*w.s.* Valkyrien
OUW	Drogden Lighthouse
OUX	Graadyb
OUY	Vyl Lighthouse
OUZ	Horns Rev Lighthouse
OVF	*w.s.* Flyvefisken
OVR	*w.s.* Söridderen
OVS	*w.s.* Spaekhuggeren
OVT	*w.s.* Tumleren
OVU	*w.s.* Söulven
OVV	*w.s.* Vindhunden
OXA	Copenhague
OXB	Blaavandshuk Lighthouse
OXC	Gedser
OXD	Gedser Havn
OZB	*s.s.* Hellig Olad
OZC	*s.s.* Oscar II.
OZD	*s.s.* United States
OZE	*s.s.* Köbenhavn
OZF	*s.s.* Selandia
OZG	*s.s.* Jutlandia
OZH	*s.s.* Viking
OZL	*s.s.* Frederick VIII.
PAA	*w.s.* De Zeven Provincien
PAB	*w.s.* Maarten Harpertz Tromp
PAC	*w.s.* De Ruyter
PAD	*w.s.* Hertog Hendrik
PAE	*w.s.* Koningin Regentes
PAF	*w.s.* Zeeland
PAG	Torpedoboot
PAH	*w.s.* Holland
PAJ	*w.s.* Noordbrabant
PAK	*w.s.* Gelderland
PAL	*w.s.* Jacob van Heemskerk
PAM	*w.s.* Kortenaer
PAN	*w.s.* Evertsen
PAO	*w.s.* Piet Hein
PAQ	*w.s.* Hydra
PAR	*w.s.* Para
PAR	*w.s.* Meudsa
PAU	*w.s.* Gruno
PAV	*w.s.* Brinio
PAW	*w.s.* Frisio
PAZ	*w.s.* Zeehond
PBO	*w.s.* Onderzeeboot
PBS	*w.s.* Panter
PBT	*w.s.* Hermelijn
PBU	*w.s.* Jakhals
PBV	*w.s.* Vos
PBW	*w.s.* Wolf

PBX	*w.s.* Lynx
PBY	*w.s.* Fret
PBZ	*w.s.* Bulhond
PCA	Amsterdam
PCB	Helder
PCC	Hellevoetsluis
PCH	Scheveningen-Port
PCN	Noord-Hinder Lightship
PCO	Haaks Lightship
PDA	*g.s.* Koningin Wilhelmina
PDB	*s.s.* Koningin Regentes
PDC	*s.s.* Prins Hendrik
PDD	*s.s.* Mecklenburg
PDE	*s.s.* Oranje Nassau
PDF	*s.s.* Prinses Juliana
PDG	*s.s.* Batavier II.
PDH	*s.s.* Batavier III.
PDI	*s.s.* Batavier IV.
PDJ	*s.s.* Batavier V.
PEA	*s.s.* Rotterdam
PEB	*s.s.* Nieuw Amsterdam
PEC	*s.s.* Noordam
PED	*s.s.* Ryndam
PEE	*s.s.* Potsdam
PEF	*s.s.* Frisia
PEG	*s.s.* Gelria
PEH	*s.s.* Hollandia
PEI	*s.s.* Zeelandia
PEK	*s.s.* Prins Frederik Hendrik
PEL	*s.s.* Prins Maurits
PEM	*s.s.* Oranje Nassau
PEN	*s.s.* Prins der Nederlanden
PES	*s.s.* Statendam
PET	*s.s.* Tubantia
PFA	*s.s.* Goentoer
PFB	*s.s.* Ophir
PFC	*s.s.* Tambora
PFD	*s.s.* Kawi
PFE	*s.s.* Sindoro
PFF	*s.s.* Tabanan
PFG	*s.s.* Wilio
PFH	*s.s.* Rindjani
PFI	*s.s.* Grotius
PFJ	*s.s.* Konig Willem III.
PFK	*s.s.* Rembrandt
PFM	*s.s.* Vondel
PFN	*s.s.* Prinses Juliana
PFO	*s.s.* Koningin der Nederlanden
PFP	*s.s.* Oranje
PFQ	*s.s.* Koningin Emma
PFR	*s.s.* Prins der Nederlanden
PFS	*s.s.* Insulande
PGA	*s.s.* Medan
PGB	*s.s.* Menado
PGC	*s.s.* Gorontalo
PGD	*s.s.* Bandoeng
PGE	*s.s.* Merauke
PGF	*s.s.* Ternate
PGG	*s.s.* Deli
PGH	*s.s.* Samarinda
PGI	*s.s.* Madioen
PGJ	*s.s.* Soerakarta
PGK	*s.s.* Palembang
PGL	*s.s.* Krakatau
PGM	*s.s.* Sumatra
PGN	*s.s.* Lombok
PGO	*s.s.* Celebes

PGP	*s.s.* Kangean
PGQ	*s.s.* Karimata
PGR	*s.s.* Nias
PGS	*s.s.* Kambangan
PGT	*s.s.* Billiton
PGU	*s.s.* Boeton
PGV	*s.s.* Batjan
PGW	*s.s.* Karimoen
PGX	*s.s.* Oosterdijk
PGY	*s.s.* Noorderdijk
PGZ	*s.s.* Westerdijk
PHA	*s.s.* Radja
PHB	*s.s.* Riouw
PHC	*s.s.* Rotti
PHD	*s.s.* Arakan
PHE	*s.s.* Jacatra
PHF	*s.s.* Djember
PHG	*s.s.* Noordwijk
PHI	*s.s.* Banka
PHJ	*s.s.* Bawean
PHK	*s.s.* Boeroe
PHL	*s.s.* Roepat
PHM	*s.s.* Rondo
PHY	*w.s.* Parahyba
PIA	*s.s.* Roode Zee
PIB	*tug* Alas
PIC	*s.s.* Witte Zee
PID	*s.s.* Zwarte Zee
PIE	*s.s.* Rotterdam
PJA	Araba
PJB	Bonaire
PJC	Curaçao
PJN	*s.s.* Nickerie
PJO	*s.s.* Commewijne
PKA	Sabang
PKB	Weltevreden
PKC	Sitoebondo
PKD	Koepang
PKL	Ambom
PLA	*g.s.* Telegraaf
PMA	*s.s.* Van Cloon
PMB	Pemba, Zanzibar
PMB	*s.s.* Van Overstraten
PMC	*s.s.* Houtman
PMD	*s.s.* Melchior Treub
PME	*s.s.* Rumpheus
PMF	*s.s.* Tasman
PMG	*s.s.* Van Lansberghe
PNA	Ponta Negra
PRN	*w.s.* Parana
PYH	*w.s.* Piauhy
RAR	Odessa
RAS	Vladivostok RAS
RAU	Nicolaiewsk RAU
RAW	Wiborg
RBP	*w.s.* Republica
RDK	*s.s.* Divinsk
REA	Kronstadt
REB	Helsingfors
REC	Hapsal
RED	Libau RED
REF	Presté
REG	Sébastopol
REH	Kerch
REI	Batoum
REJ	Vladivostok REJ
RFB	*w.s.* Standart
RFD	*w.s.* Poliarnaya Zirezda
RFF	*w.s.* Neva
RFG	*w.s.* Stréla
RFI	*w.s.* Aleksandria
RGA	*w.s.* Rurik
RGB	*w.s.* Andrei Pervozvannyi
RGC	*w.s.* Imperator Pavel I.
RGF	*w.s.* Tsesarevitch
RGH	*w.s.* Slava
RGI	*w.s.* Gromoboi
RGJ	*w.s.* Baian
RGK	*w.s.* Admiral Makharoff
RGL	*w.s.* Rossia
RGM	*w.s.* Bogatyr
RGN	*w.s.* Oleg
RGO	*w.s.* Aurora
RGP	*w.s.* Amour
RGQ	*w.s.* Ennissey
RGR	*w.s.* Okean
RGS	*w.s.* Pallada
RGT	*w.s.* Nikolaeff
RGU	*w.s.* Khrabryi
RGV	*w.s.* Koreets
RGW	*w.s.* Bobr
RGX	*w.s.* Sivouch
RGZ	*w.s.* Guiliak
RHA	*w.s.* Novik
RHB	*w.s.* Sibirskii Strelok
RHC	*w.s.* General Kondratienko
RHF	*w.s.* Okhotnik
RHI	*w.s.* Pogranitchnik
RHK	*w.s.* Emir Boukharskı
RHL	*w.s.* Finn
RHN	*w.s.* Moskvitianin
RHO	*w.s.* Dobrovolets
RHP	*w.s.* Vsadnik
RHQ	*w.s.* Gaidamak
RHR	*w.s.* Oussouriets
RHS	*w.s.* Tourkmen Stavropolskii
RHT	*w.s.* Oukraina
RHU	*w.s.* Kazanets
RHV	*w.s.* Strachnyi
RHW	*w.s.* Donskoi Kazak
RHX	*w.s.* Zabaikalets
RHZ	*w.s.* Steregouchtii
RIA	*w.s.* Voiskovoi
RIB	*w.s.* Angara
RIC	*w.s.* Oka
RID	*w.s.* Kama
RIE	*w.s.* Pechora
RIG	*w.s.* Soukhona
RIJ	*w.s.* Mezen
RIK	*w.s.* Riga
RKA	*w.s.* Evstafii
RKC	*w.s.* Joann Zlatooust
RKD	*w.s.* Panteleimon
RKE	*w.s.* Tri Sviatitelia
RKF	*w.s.* Rostislav
RKG	*w.s.* Sinop
RKI	*w.s.* Gheorgii Pobedonosetz
RKL	*w.s.* Pamiat Merkouria
RKM	*w.s.* Kagoul
RKO	*w.s.* Donetz
RKP	*w.s.* Ouraletz
RKS	*w.s.* Koubanetz
RKT	*w.s.* Teretz
RKU	*w.s.* Almaz
RKV	*w.s.* Prout

RKW	*w.s.* Dounaï
RKX	*w.s.* Kronstadt
RKZ	*w.s.* Berezan
RLB	*w.s.* Leitenant Chestakoff
RLC	*w.s.* Kapitan Saken
RLD	*w.s.* Leitenant Zatsarennyi
RLE	*w.s.* Kapitan Leitenant Baranoff
RMA	*w.s.* Askold
RMB	*w.s.* Zemtchoug
RMD	*w.s.* Oussourri
RME	*w.s.* Mangougai
RMF	*w.s.* Mandjour
RMH	*w.s.* Taimir
RML	*w.s.* Vaiguatch
RNF	Fort D'Alexandrovsk
RNL	Nicolaiewsk
RNN	Naïakhan
RNR	Anadyr
RNS	*g.s.* Stavropol
RNT	*g.s.* Tver
RNZ	*g.s.* Admiral Zavoïko
ROE	Rade de Taganrog
ROK	Pétrowsk, Daghestan
ROL	Libau
ROR	Reval
ROT	Okhotsk
RPA	*s.s.* Afon
RPB	*s.s.* Imperator Nicolaï
RPC	*s.s.* Tchikhatcheff
RPE	*s.s.* Odessa
RPF	*s.s.* Tséssarévitch Gueorgui
RPG	*s.s.* Vélikaïa-Kniaguinia-Xénia
RPH	*s.s.* Prinzessa Erguénia Oldenbourgskaia
RPI	*s.s.* Jérusalem
RPK	Pétropavlovsk
RPL	*s.s.* Korolévna
RPN	Kerbinskaïa
RPO	*s.s.* Véliki-Kniaz Constantine
RPQ	*s.s.* Véliki-Kniaz Alexii
RPR	*s.s.* Piotre Véliki
RPW	*s.s.* Véliki-Kniaz Alexandre I
RPX	*s.s.* Sviatoi Nicolai
RPZ	*s.s.* Polezny
RQA	Arkhangel
RQT	Rade d'Astrakhan
RRG	Riga
RRN	Rouno
RRT	Taganrog
RSA	*s.s.* Birma
RSC	*s.s.* Tsar
RSG	*w.s.* Rio Grande do Sul
RSK	*s.s.* Koursk
RSR	*s.s.* Rossia
RVG	*w.s.* Rio Grande do Norte
SAA	Karlskrona
SAB	Göteborg
SAC	Trälleborg
SAD	Oscar-Frederiksborg
SAE	Tingstäde
SBA	*w.s.* Svea
SBB	*w.s.* Göta
SBC	*w.s.* Thule
SBD	*w.s.* Oden
SBE	*w.s.* Thor
SBF	*w.s.* Niord

SBG	*w.s.* Dristigheten
SBH	*w.s.* Ara
SBI	*w.s.* Wasa
SBJ	*w.s.* Tapperheten
SBK	*w.s.* Manligheten
SBL	*w.s.* Oscar II.
SBM	*w.s.* Fylgia
SBO	*w.s.* Ornen
SBQ	*w.s.* Claes Horn
SBR	*w.s.* Clas Uggla
SBS	*w.s.* Psilander
SBT	*w.s.* Rota
SBU	*w.s.* Skuld
SBV	*w.s.* Edda
SBX	*w.s.* Blenda
SBY	*w.s.* Mode
SBZ	*w.s.* Magne
SCA	*w.s.* Wale
SCB	*w.s.* Ragnar
SCC	*w.s.* Sigurd
SCD	*w.s.* Vidar
SCE	*w.s.* Hugin
SCF	*w.s.* Munin
SCG	*w.s.* Tirfing
SCH	*w.s.* Thordön
SCI	*w.s.* Clas Flemming
SCJ	*w.s.* Skäggald
SCK	*w.s.* Svensksund
SCL	*w.s.* Sverige
SCM	*w.s.* Urd
SCN	*w.s.* St. Catharina
SEA	*g.s.* Konung Gustav V.
SEB	*g.s.* Drottning Viktoria
SFA	*s.s.* S. Paul
SFB	*s.s.* Saga
SFC	*s.s.* Thule
SFD	*s.s.* Texas
SFE	*s.s.* Indianic
SFF	*s.s.* Hellenic
SFG	*s.s.* Tasmanic
SFH	*s.s.* Australic
SFI	*s.s.* Murjek
SFJ	*s.s.* Torne
SFK	*s.s.* Norrbotten
SFL	*s.s.* Abisko
SFN	*s.s.* Kiruna
SFO	*s.s.* Vollrath Tham
SFP	*s.s.* Sir Ernest Cassel
SFQ	*s.s.* Khalix
SFQ	*s.s.* Kratos
SFR	*s.s.* Bia
SFS	*s.s.* Africanic
SFT	*s.s.* Atlantic
SFU	*s.s.* Baltic
SGP	*w.s.* Sergipe
SNV	Villegaignon
SNX	Guaratiba
SNZ	Raza
SOW	*g.s.* Carioca
SPA	Amaralina
SPB	Para
SPJ	Juncçao
SPL	Lagôa
SPN	Fernando de Noronha
SPO	Olinda (Pernambuco)
SPS	Monte Serrat
SPT	Cap S Thomé
SPY	Babylonia

SQM	Manaos
SQS	Santorem
SQV	Porto Velho
SRA	*g.s.* Rio de Janeiro
SRB	*g.s.* Minas Geraes
SRC	*g.s.* S. Paulo
SRD	*g.s.* Ceara
SRE	*g.s.* Bahia
SRF	*g.s.* Acre
SRG	*g.s.* Satellite
SRH	*g.s.* Sergipe
SRI	*g.s.* Orion
SRJ	*g.s.* Aymore
SRK	*g.s.* Maranhao
SRL	*g.s.* Olinda
SRM	*g.s.* Brazil
SRN	*g.s.* Ladario
SRO	*g.s.* Mércêdes
SRP	*g.s.* Venus
SRQ	*g.s.* Para
SRR	*g.s.* Saturno
SRS	*g.s.* Manaos
SRT	*g.s.* Jupiter
SRU	*g.s.* Iris
SRV	*s.s.* Prudente de Moraes
SRW	*g.s.* Sirio
SRX	*g.s.* Oyapock
SRY	*g.s.* Javary
SRZ	*s.s.* Gayaz
STA	*s.s.* Itapura
STB	*s.s.* Itatinga
STC	*s.s.* Itassuce
STD	*s.s.* Itapuhy
STE	*s.s.* Itaquera
STF	*s.s.* Itagiba
SUA	*s.y.* Mahroussa
SUB	Port Said
SVA	*s.s.* Athinai
SVI	*s.s.* Ioannina
SVK	*s.s.* Thesaloniki
SVP	*s.s.* Patris
SVT	*s.s.* Themistocles
SXA	Athens
SXC	Salonica
SXL	Salamis
SXS	Syra
SXT	Thasos
SYA	*w.s.* Averoff
SYB	*w.s.* Velos
SYC	*w.s.* Lonchi
SYD	*w.s.* Doxa
SYE	*w.s.* Ieras
SYF	*w.s.* Sfendoni
SYG	*w.s.* Nea Gennea
SYH	*w.s.* Hydra
SYI	*w.s.* Aspis
SYJ	*w.s.* Kanaris
SYK	*w.s.* Keravnos
SYL	*w.s.* Leon
SYM	*w.s.* Amfitrite
SYN	*w.s.* Niki
SYO	*w.s.* Aetos
SYP	*w.s.* Panthir
SYQ	*w.s.* Psara
SYR	*w.s.* Nafkratousa
SYS	*w.s.* Spetsai
SYT	*w.s.* Thyella
SYU	*w.s.* Alcyon
SYV	*w.s.* Aigli
SYW	*w.s.* Arethousa
SYX	*w.s.* Daphni
SYY	*w.s.* Doris
SYZ	*w.s.* Thetis
TAM	*w.s.* Tamoyo
TPY	*w.s.* Tupy
TRE	*w.s.* Tamandaré
TSD	*w.s.* Tiradentes
TYB	*w.s.* Tymbira
UAB	*w.s.* Danton
UAC	*w.s.* Mirabeau
UAD	*w.s.* Voltaire
UAE	*w.s.* Diderot
UAG	*w.s.* Condorcet
UAH	*w.s.* Vergniaud
UAI	*w.s.* Justice
UAJ	*w.s.* Vérité
UAK	*w.s.* Democratie
UAL	*w.s.* Patrie
UAM	*w.s.* République
UAN	*w.s.* Saffren
UAO	*s.s.* Massena
UAP	*w.s.* Bouvet
UAQ	*w.s.* Charlemagne
UAR	*w.s.* Gaulois
UAS	*w.s.* St. Louis
UAT	*w.s.* Carnot
UAV	*w.s.* Charles Martel
UAW	*w.s.* Jauréguiberry
UAX	*w.s.* Brennus
UAY	*w.s.* Jean-Bart
UAZ	*w.s.* Courbet
UCA	*w.s.* Waldeck-Rousseau
UCB	*w.s.* Edgar Quinet
UCD	*w.s.* Ernest Renan
UCE	*w.s.* Jules Michelet
UCG	*w.s.* Victor Hugo
UCH	*w.s.* Jules Ferry
UCI	*w.s.* Léon Gambetta
UCJ	*w.s.* Amiral Aube
UCK	*w.s.* Condé
UCL	*w.s.* Gloire
UCM	*w.s.* Marseillaise
UCN	*w.s.* Dupetit Thouars
UCO	*w.s.* Montcalm
UCP	*w.s.* Gueydon
UCQ	*w.s.* Kléber
UCR	*w.s.* Desaix
UCS	*w.s.* Dupleix
UCT	*w.s.* Jeanne d'Arc
UCV	*w.s.* Guichen
UCW	*w.s.* Châteaurenault
UCX	*w.s.* Jurien de la Graviere
UCR	*s.s.* Monte Video
UDA	*w.s.* Durandal
UDB	*w.s.* Hallebarde
UDC	*w.s.* Fauconneau
UDE	*w.s.* Pique
UDG	*w.s.* Epée
UDH	*w.s.* Yatagan
UDI	*w.s.* Pertuisane
UDJ	*w.s.* Escopette
UDK	*w.s.* Rapière
UDL	*w.s.* Flamberge
UDM	*w.s.* Arquebuse
UDN	*w.s.* Mousquet
UDO	*w.s.* Sagaie

UDP	*w.s.* Harpon
UDQ	*w.s.* Fronde
UDR	*w.s.* Carabine
UDS	*w.s.* Sarbacane
UDT	*w.s.* Arabalète
UDV	*w.s.* Javeline
UDW	*w.s.* Epieu
UDX	*w.s.* Dard
UDY	*w.s.* Baliste
UDZ	*w.s.* Mousqueton
UDJ	*w.s.* 18 de Julio
UEA	*w.s.* Arc
UEB	*s.s.* Pistolet
UEC	*w.s.* Belier
UED	*w.s.* Catapulte
UEG	*w.s.* Bombarde
UEH	*w.s.* Francisque
UEI	*w.s.* Sabre
UEJ	*w.s.* Claymore
UEK	*w.s.* Stylet
UEL	*w.s.* Tromblon
UEM	*w.s.* Obusier
UEN	*w.s.* Pierrier
UEO	*w.s.* Mortier
UEP	*w.s.* Carquois
UEQ	*w.s.* Strident
UER	*w.s.* Fleuret
UES	*w.s.* Coutelas
UET	*w.s.* Sabretache
UEV	*w.s.* Oriflamme
UEW	*w.s.* Sape
UEX	*w.s.* Gabion
UEY	*w.s.* Branlebas
UEZ	*w.s.* Fanfare
UFA	*w.s.* Cognée
UFB	*w.s.* Hache
UFC	*w.s.* Massue
UFD	*w.s.* Etendard
UFE	*w.s.* Fanion
UFG	*w.s.* Chasseur
UFH	*w.s.* Carabinier
UFI	*w.s.* Glaive
UFJ	*w.s.* Poignard
UFK	*w.s.* Spahi
UFL	*w.s.* Voltigeur
UFM	*w.s.* Tirailleur
UFN	*w.s.* Lansquenet
UFO	*w.s.* Fantassin
UFP	*w.s.* Cavalier
UFQ	*w.s.* Hussard
UFR	*w.s.* Mameluck
UFS	*w.s.* Janissaire
UFT	*w.s.* Casque
UFV	*w.s.* Bouclier
UFW	*w.s.* Fourche
UFX	*w.s.* Enseigne Henry
UFY	*w.s.* Dague
UFZ	*w.s.* Aspirant-Herber
UGA	*w.s.* Cimeterre
UGB	*w.s.* Faulx
UGC	*w.s.* Boutefeu
UGD	*w.s.* Commandant Bory
UGE	*w.s.* Commandant Riviere
UGH	*w.s.* Dehorter
UGI	*w.s.* Francis Garnier
UGJ	*w.s.* Capitaine Mehl
UGK	*w.s.* Bisson
UGL	*w.s.* Renaudin
UGM	*w.s.* Protet
UGN	*w.s.* Magon
UGO	*w.s.* Mangini
UGP	*w.s.* Commandant Lucas
UGD	*w.s.* Maldonado
UHA	*w.s.* Pluton
UHB	*w.s.* Cerbère
UHC	*w.s.* Casabianca
UHD	*w.s.* Cassini
UIA	*w.s.* Henri IV.
UIB	*w.s.* Pothuau
UIC	*w.s.* Latouche-Treville
UID	*w.s.* Amiral Charner
UIE	*w.s.* Bruix
UIG	*w.s.* d'Entrecasteaux
UIH	*w.s.* Descartes
UIJ	*w.s.* du Chayla
UIK	*w.s.* Cassard
UIL	*w.s.* Friant
UIM	*w.s.* Foudre
UIN	*w.s.* Lavoisier
UIO	*w.s.* d'Estrées
UIP	*w.s.* Forbin
UIQ	*w.s.* Sourcouf
UIR	*w.s.* Cosmao
UIS	*w.s.* d'Iberville
UIT	*w.s.* Dunois
UIV	*w.s.* La Hire
UIW	*w.s.* Kersaint
UIX	*w.s.* Zélée
UIY	*w.s.* Surprise
UIZ	*w.s.* Décidée
UIG	*w.s.* Ingeniero
UJA	*w.s.* Bien Hoa
UJB	*w.s.* Vinh Long
UJC	*w.s.* Duguay Trouin
UJD	*w.s.* Loiret
UJE	*w.s.* Drôme
UJG	*w.s.* Rhône
UJH	*w.s.* Garonne
UJK	*w.s.* Borda
UKA	*w.s.* Ibis
UKB	*w.s.* Vigilante
UKC	*w.s.* Argus
UKD	*w.s.* Doudart de Lagrée
ULA	*w.s.* Atlas
ULB	*w.s.* Bouvines
ULC	*w.s.* Centaure
ULD	*w.s.* Buffle
ULE	*w.s.* Cauldan
ULF	*w.s.* Furieux
ULG	*w.s.* Goliath
ULH	*w.s.* Samson
ULI	*w.s.* Cyclope
ULJ	*w.s.* Taillebourg
ULK	*w.s.* Sentinelle
ULM	*w.s.* Estafette
ULN	*w.s.* Jeanne-Blanche
ULO	*w.s.* Vaucluse
ULP	*w.s.* Infatigable
ULQ	*w.s.* Marceau
ULR	*w.s.* Requin
ULT	*w.s.* Amiral Trehouart
UMV	Cerrito
UOB	*w.s.* Admiral Spaun
UOD	*w.s.* Arpàd
UOI	*w.s.* Aspern

UOQ	*w.s.* Badenberg
UOV	*w.s.* Balaton
UPB	*w.s.* Budapest
UPL	*w.s.* Csepel
UPO	*w.s.* Csikós
UPR	*w.s.* Dinara
UPW	*w.s.* Erzherzog Franz Ferdinand
UPY	Banco Ingles
UPZ	*w.s.* Erzherzog Ferdinand Max†
UQF	*w.s.* Erzherzog Friedrich
UQK	*w.s.* Erzherzog Karl
UQX	*w.s.* Gäa
URM	*w.s.* Helgoland
URN	*w.s.* Habsburg
URR	*w.s.* Herkules
URU	*w.s.* Huszar
URU	*w.s.* Uruguay
USC	*w.s.* Kaiser Karl VI.
USJ	*w.s.* Kaiser Franz Joseph I.
USN	*w.s.* Kaiserin Elisabeth
USQ	*w.s.* Kaiserin und Königin Maria Theresia
USW	*w.s.* Lacroma
USY	*w.s.* Lika
UTC	*w.s.* Lussin
UTM	*w.s.* Miramar
UTO	*w.s.* Monarch
UTV	*w.s.* Novara
UTX	*w.s.* Orjen
UUB	*w.s.* Pandur
UUD	*w.s.* Panther
UUK	*w.s.* Pelikan
UUN	*w.s.* Prinz Eugen
UUS	*w.s.* Radetsky
UUW	*w.s.* Réka
UVA	*w.s.* Saida
UVG	*w.s.* S. Georg
UVH	*w.s.* Scharfschütze
UVJ	*w.s.* Streiter
UVO	*w.s.* Szigetvár
UVW	*w.s.* Tátra
UVY	*w.s.* Taurus
UWB	*w.s.* Tegetthoff
UWH	*w.s.* Temes
UWL	*w.s.* Triglav
UWP	*w.s.* Turul
UWU	*w.s.* Ulan
UWZ	*w.s.* Uskoke
UXL	*w.s.* Velebit
UXS	*w.s.* Vesta
UXV	*w.s.* Viribus Unitis
UYA	*w.s.* Wien
UYB	*g.s.* Oyarvide
UYF	*w.s.* Wildfang
UYT	*w.s.* Zenta
UYY	*w.s.* Zrinyi
VAA	Halifax Dockyard
VAB	Point Grey
VAC	Cape Lazo
VAD	Pachena
VAE	Estevan, B.C.
VAF	Alert Bay
VAG	Triangle Island
VAH	Dead Tree Point
VAI	Ikeda Head
VAJ	Prince Rupert (Digby Island)
VAK	Victoria, B.C.

VBA	Port Arthur (Ont.)
VBB	Sault Ste Marie (Ont.)
VBC	Midland (Ont.)
VBD	Tobermory (Ont.)
VBE	Point Edward (Sarnia)
VBM	Le Pas (Man.)
VBN	Port Nelson (Hudson Bay)
VCA	Montreal
VCB	Three Rivers (Que.)
VCC	Quebec
VCD	Grosse Isle (Que.)
VCE	Cape Race
VCF	Father Point
VCG	Fame Point
VCH	Point Riche
VCI	Heath Point
VCJ	Harrington
VCK	Clarke City
VCL	Point Amour
VCM	Belle Isle
VCN	Grindstone (Magdalen Islands)
VCO	North Sydney (N. S.)
VCP	Cape Bear
VCQ	Pictou (N. S.)
VCR	Cape Ray
VCS	Camperdown
VCT	Sable Island
VCU	Cape Sable
VCV	St. John (N. B.) (Partridge Island)
VDA	*g.s.* Niobe
VDB	*g.s.* Rainbow
VDC	*g.s.* Canada
VDD	*g.s.* Minto
VDE	*g.s.* Stanley
VDF	*g.s.* Lady Laurier
VDG	*g.s.* Aberdeen
VDH	*g.s.* Druid
VDI	*g.s.* Earl Grey
VDJ	*g.s.* Montcalm
VDK	*g.s.* Montmagny
VDL	*g.s.* Lady Grey
VDM	*g.s.* Quadra
VDN	*g.s.* Estevan
VDO	*g.s.* Dollard
VDP	*g.s.* Newington
VDR	Lurcher Lightship
VDS	*g.s.* Simcoe
VFA	*s.s.* Princess Adelaide
VFB	*s.s.* Princess Mary
VFC	*s.s.* Princess Beatrice
VFD	*s.s.* Princess Alice
VFE	*s.s.* Princess Charlotte
VFG	*s.s.* Princess Royal
VFH	*s.s.* Princess May
VFI	*s.s.* Princess Sophia
VFJ	*s.s.* Princess Ena
VFK	*s.s.* Tees
VFL	*s.s.* Prince Albert
VFM	*s.s.* Prince John
VFN	*s.s.* Morwenna
VFO	*s.s.* City of Sydney
VFP	*s.s.* Empire
VFQ	*s.s.* Alberta
VFR	*s.s.* Province
VFS	*s.s.* Boston
VFT	*s.y.* Florence

VFU	*s.y.* Aquilo
VFV	*s.s.* Salvor
VFW	*s.s.* A. W. Perry
VFX	*s.s.* Lord Strathcona
VFZ	*s.s.* Camosun
VGA	*s.s.* Royal George
VGB	*s.s.* Royal Edward
VGC	*s.s.* Keewatin
VGD	*s.s.* Hamonic
VGE	*s.s.* Huronic
VGF	*s.s.* Saronic
VGG	*s.s.* Athabasca
VGH	*s.s.* Manitoba
VGI	*s.s.* Assiniboia
VGJ	*s.s.* Prince Arthur
VGK	*s.s.* Prince George
VGL	*s.s.* St. Ignace
VGM	*s.s.* Robert Dollar
VGN	*s.s.* Chelobsin
VGO	*s.s.* Evangeline
VGP	*s.s.* Halifax
VGR	*s.s.* Douglas H. Thomas
VGS	*s.y.* Solgar
VGT	*s.s.* Princess Maquinna
VGV	*s.s.* Seal
VGW	*s.s.* Noronic
VHB	*s.s.* Levuka
VHC	*s.s.* Kyarra
VHD	*s.s.* Kanowna
VHE	*s.s.* Karoola
VHF	*s.s.* Bombala
VHG	*s.s.* Willochra
VHH	*s.s.* Warilda
VHI	*s.s.* Wandilla
VHJ	*s.s.* Grantala
VHK	*s.s.* Western Australia
VHL	*s.s.* Dimboola
VHM	*s.s.* Kapunda
VHN	*s.s.* Katoomba
VHO	*s.s.* Canberra
VHP	*s.s.* Indarra
VHQ	*s.s.* Fiona
VHT	*s.s.* Nontoro
VHU	*s.s.* Mataram
VHV	*s.s.* Matunga
VIA	Adelaide
VIB	Brisbane
VIC	Cooktown
VID	Darwin, S. Australia
VIE	Esperance, W. Australia
VIG	Port Moresby
VIH	Hobart
VII	Thursday Island
VIL	Flinders Island
VIM	Melbourne
VIN	Geraldton
VIO	Broome
VIP	Perth, W. Australia
VIR	Rockhampton
VIS	Sydney
VIT	Townsville
VIW	Wyndham, W. Australia
VIY	Mount Gambier
VIZ	Roebourne
VJC	*s.s.* Zealandia
VJF	*s.s.* Morinda
VKA	*g.s.* Australia
VKB	*g.s.* Brisbane
VKC	*g.s.* Melbourne
VKD	*g.s.* Sydney
VKE	*g.s.* Encounter
VKF	*g.s.* Pioneer
VKG	*g.s.* Protector
VKH	*g.s.* Warrego
VKI	*g.s.* Yarra
VKJ	*g.s.* Parramatta
VKK	*g.s.* Derwent
VKL	*g.s.* Torrens
VKM	*g.s.* Swan
VKN	*g.s.* Navy Office
VKO	*g.s.* Cerberus
VKP	*g.s.* Flinders Island Base
VKQ	*g.s.* Garden Island Base
VKR	*g.s.* Cockburn Sound Base
VKS	*g.s.* Port Stevens Base
VLC	Chatham Islands
VLD	Auckland Radio
VLE	*s.s.* Maheno
VLF	*s.s.* Tofua
VLG	*s.s.* Maunganui
VLH	*s.s.* Haurolo
VLI	*s.s.* Aorangi
VLJ	*s.s.* Wahine
VLK	*s.s.* Makura
VLL	*s.s.* Talune
VLM	*s.s.* Moeraki
VLN	*s.s.* Manuka
VLO	*s.s.* Moana
VLP	*s.s.* Manapouri
VLQ	*s.s.* Warrimoo
VLR	*s.s.* Marama
VLT	*s.s.* Maitai
VLU	*s.s.* Atua
VLV	*s.s.* Navua
VLW	Wellington Radio
VLX	*g.s.* Tutanekai
VLZ	*s.s.* Maori
VMK	*s.s.* Mokoia
VNA	*g.s.* Ludwig Wiener
VNC	Cape Town
VND	Durban
VOA	Battle Harbour
VOB	Venison Island
VOC	American Tickle
VOD	Domino
VOE	Grady
VOF	Smokey Tickle
VOG	Holton
VOH	Cape Harrison
VOI	Makkovik
VOJ	Fogo
VOK	*s.s.* Adventure
VOL	*s.s.* Algerine
VOM	*s.s.* Bellaventure
VON	*s.s.* Beothic
VOO	*s.s.* Bonaventure
VOP	*s.s.* Bruce
VOQ	*s.s.* Invermore
VOR	*s.s.* Kyle
VOS	*s.s.* Lintrose
VOT	*s.s.* Nascopie
VOU	*s.s.* Eagle
VOV	*s.s.* Meigle
VOW	*s.s.* Newfoundland
VOX	*s.s.* Neptune
VPA	Demerara
VPB	Colombo
VPC	Port Stanley

VPD	Suva	WCD	s.s. Octorava
VPE	Labasa	WCF	s.s. Favorite
VPF	Taveuni	WCG	Brooklyn
VPG	Accra	WCH	Boston
VPH	Jamaica (Bowden)	WCM	Calumet (Mich.)
VPI	Aden Radio	WCN	s.s. North Land
VPJ	Berbera Radio	WCT	s.s. Theodore Roosevelt
VPK	Cocos	WCX	Cleveland (Ohio)
VPL	Trinidad	WCY	Cape May (N.J.)
VPM	Tobago	WCZ	s.s. Illinois
VPN	Nassau, Bahamas	WDA	s.s. Pere Marquette
VPT	Malta Island	WDB	s.s. Pere Marquette 19
VPU	Sierra Leone	WDC	s.s. Pere Marquette 17
VRA	s.s. Coppename	WDD	s.s. Pere Marquette 18
VRB	s.s. Marowijne	WDE	s.s. Pere Marquette 20
VRC	s.s. Saramacca	WDI	s.s. City of South Haven
VRD	s.s. Suriname	WDL	s.s. Lakeland
VRE	s.s. Nile	WDM	Duluth (Minn.)
VTB	Bassein	WDN	s.s. Ann Arbor No. 3
VTD	Diamond Island	WDO	s.s. Ann Arbor No. 4
VTJ	Jask	WDP	s.s. Ann Arbor No. 5
VTM	Mergui	WDR	Detroit (Mich.)
VTP	Port Blair	WDS	s.s. City of Grand Rapids
VTT	Table Island	WDT	s.s. City of Chicago
VTV	Victoria Point	WDU	s.s. Puritan
VUB	g.s. Dufferin	WDV	s.s. City of Benton Harbor
VUC	g.s. Hardinge	WDW	s.s. Holland
VWB	Bombay Radio	WDY	s.y. Lydonia
VWC	Calcutta Radio	WEA	s.s. City of Cleveland III.
VWK	Karachi Radio	WEB	s.s. City of Mackinac II.
VWS	Sandheads	WEC	s.s. City of Detroit II.
WAA	s.s. Alameda	WED	s.s. Western States
WAB	s.s. Buckman	WEE	s.s. Eastern States
WAC	s.s. Chicago	WEF	s.s. City of Detroit III.
WAD	s.s. Victoria	WEG	s.s. City of St. Ignace
WAE	s.s. Edith	WEH	s.s. City of Alpena II.
WAF	s.s. Admiral Farragut	WEJ	s.s. Nyack
WAH	s.s. Dora	WEK	s.s. Minnesota
WAI	s.s. Latouche	WEL	s.s. E. G. Crosby
WAJ	s.s. Jefferson	WEN	s.s. North American
WAL	s.s. Santa Ana	WEO	s.s. South American
WAN	s.s. Northwestern	WEP	El Paso (Texas)
WAO	s.s. Dirigo	WEQ	s.s. Col. James M. Schoonmaker
WAR	s.s. Cordova		
WAS	s.s. Admiral Sampson	WER	s.s. William P. Snyder
WAU	s.s. Dolphin	WES	s.s. William P. Snyder, Junr.
WAV	s.s. Seward	WET	s.s. Shenango
WAW	s.s. Watson	WEU	s.s. Wilpen
WAX	Atlantic City, N.J.	WEW	s.s. Marquette and Bessemer No. I.
WBA	s.s. Santa Clara		
WBC	s.s. Santa Catalina	WEX	s.s. Marquette and Bessemer No. II.
WBD	s.s. Santa Cruz		
WBF	Boston (Mass.)	WEY	s.s. Alvina
WBG	s.s. Iroquois	WEZ	s.s. Ashtabula
WBH	s.s. Chippewa	WFA	s.s. Georgia
WBK	s.s. Breakwater	WFB	s.s. Alabama
WBL	Buffalo (N.Y.)	WFC	s.s. Indiana
WBM	s.s. Redondo	WFD	s.s. Iowa
WBN	Benton Harbour (Mich.)	WFE	s.s. Carolina
WBO	s.s. Nann Smith	WFF	Fort Worth
WBP	s.s. Hermosa	WFG	s.s. Arizona
WBQ	s.s. Yukon	WFH	s.s. Virginia
WBR	s.s. Bertha	WFI	s.s. Chicago
WBS	Baltimore (Md.)	WFJ	s.s. Christopher Columbus
WBV	s.s. Cabrillo	WFK	Frankfort (Mich.)
WBZ	s.s. Glory of the Seas	WFL	s.s. Sheyboygan
WCA	s.s. Tionesta	WFM	Fort Morgan (Ala.)
WCB	s.s. Juniata	WFN	s.s. Eastland
WCC	South Wellfleet (Mass.)	WFP	s.s. City of Erie

WFQ	s.s. City of Buffalo
WFR	s.s. State of Ohio
WFS	s.s. Secandbee
WFT	Barge The Limit
WFW	s.s. Maniton
WFX	s.s. Missouri
WGA	s.s. City of Seattle
WGD	s.s. Delhi
WGE	s.s. Spokane
WGH	Grand Haven (Mich.)
WGK	s.s. Curacao
WGL	s.s. State of California
WGM	Grand Marais (Minn.)
WGN	s.s. Santa Rosa
WGO	Chicago (Ill.)
WGP	s.s. President
WGQ	s.s. City of Puebla
WGR	s.s. Governor
WGS	s.s. Senator
WGT	s.s. Congress
WGU	s.s. Umatilla
WGV	Galveston (Texas)
WGW	Grand Island (La.)
WGX	s.s. Queen
WGY	s.s. City of Topeka
WGZ	s.s. Guardian
WHA	Cape Hatteras
WHB	New York WHB
WHC	s.s. Columbia
WHE	Philadelphia WHE (Pa.)
WHG	s.s. W. B. Flint
WHH	s.s. St. Francis
WHI	New York
WHJ	s.s. Sierra
WHK	New Orleans (La.)
WHL	s.s. Ventura
WHM	s.s. Sonoma
WHN	s.s. Hanalei
WHP	s.s. Mariposa
WHQ	Mackinac Island (Mich.)
WHS	s.s. Adeline Smith
WHT	s.s. Whittier
WHW	s.s. Mackinaw
WHX	s.s. Humboldt
WJX	Jacksonville (Fla.)
WKD	s.s. Dakotan
WKG	s.s. Georgian
WKH	s.s. Honolulan
WKK	s.s. Kansan
WKM	s.s. Minnesotan
WKN	s.s. Montanan
WLB	s.s. Beluga
WLC	New London (Conn.)
WLD	Ludington (Mich.)
WLN	Newton (Mass.)
WLS	Salinas (Las.)
WMA	s.s. Multnomah
WMB	s.s. Mobile (Ala.)
WMC	s.s. William Chatham
WMD	s.s. Mary Dodge
WME	Milwaukee (Wis.)
WMF	s.s. Celilo
WMI	s.s. Minnesota
WMK	s.s. Hyades
WML	s.s. Lurline
WMM	s.s. Hilorian
WMN	s.s. Enterprise
WMO	s.s. Wilhelmin
WMP	s.s. Matsonia
WMQ	s.s. Manoa
WMT	s.s. General Hubbard
WMW	Manitowoc (Wis.)
WMX	Manistique (Mich.)
WMY	s.s. Yucatan
WNB	s.s. Oliver J. Olson
WNC	s.s. Carlos
WND	s.s. Windber
WNE	s.s. Nushagak
WNF	s.s. Lyra
WNG	s.s. George W. Fenwick
WNH	s.s. Lewis Luckenbach
WNI	s.s. Leelandaw
WNJ	s.s. Navajo
WNK	s.s. Alki
WNL	s.s. Diamond Head
WNN	s.s. Corwin
WNP	s.s. Pleiades
WNR	s.s. Rochelle
WNS	s.s. Kvichak
WNT	New York, W.N.T.
WNV	s.s. Portland
WNW	s.s. San Ramon
WNX	s.s. Northland
WNY	s.s. St. Helens
WNZ	s.s. Vanguard
WOV	s.y. Venetia
WPA	s.s. Santa Cruz
WPB	s.s. Tyee Junior
WPC	s.s. Tyee
WPD	Tampa (Fla.)
WPE	s.s. Tatoosh
WPG	s.s. Goliah
WPI	s.s. Independent
WPJ	Point Judith
WPK	s.s. Kingfisher
WPN	s.s. Pioneer
WPQ	s.s. Zapora
WPR	Ensanada
WPS	s.s. Starr
WPW	s.s. Columbia
WPX	s.s. Oneonta
WPY	s.s. Wallula
WPZ	s.s. Joseph Pulitzer
WQC	s.s. Camino
WQE	s.s. Edgar H. Vance
WQG	s.s. Greenwood
WQS	s.s. Speedwell
WQY	s.s. Yosemite
WRA	s.s. Henry T. Scott
WRB	s.s. Berlin
WRC	s.s. J. B. Stetson
WRF	s.s. Fifield
WRH	s.s. Harvard
WRJ	s.s. Aroline
WRK	s.s. Falcon
WRM	s.s. Riverside
WRN	s.s. Nome City
WRO	Isle Royal (Minn.)
WRR	s.s. Roanoke
WRS	s.s. Santa Clara
WRT	s.s. George W. Elder
WRU	Port Arthur (Texas)
WRV	s.s. Alliance
WRW	s.s. F. A. Kilburn
WRY	s.s. Yale
WSA	Ashtabula (Ohio)
WSB	s.s. Francis H. Leggett
WSC	Siasconsett (Mass.)

WSD	s.s. Stanley Dollar
WSE	Seagate (N.Y.)
WSF	s s. Grace Dollar
WSG	s.s. Norwood
WSH	s.s. Chehalis
WSI	Sault St. Marie (Mich.)
WSJ	s.s. John A. Hooper
WSK	Sagaponack (N.Y.)
WSL	Layville
WSN	s.s. Centralia
WSO	s.s. Coronado
WSR	s.s. Reuce
WSS	s.s. St. Nicholas
WST	s.s. Fort Bragg
WSV	Savannah (Ga.)
WSW	s.s. Williamette
WSX	s.s. Klamath
WSY	Virginia Beach (Va.)
WTA	s.s. Erskine M. Phelps
WTB	s.s. Argyll
WTC	s.s. Lansing
WTD	s.s. Oleum
WTE	s.s. Roma
WTF	s.s. Santa Maria
WTG	s.s. Santa Rita
WTH	s.s. Washtenaw
WTI	s.s. Catania
WTK	s.s. J. A. Chanslor
WTM	s.s. W. S. Porter
WTN	s.s. Wm. F. Herrin
WTR	s.s. Richmond
WTS	s.s. Col. E. L. Drake
WTT	s.s. Atlas
WTU	s.s. S. O. Co. No. 91
WTV	s.s. Captain A. F. Lucas
WTW	s.s. Maverick
WTX	s.s. Asuncion
WTY	s.s. S. O. Co. No. 93
WTZ	s.s. S. O. Co. No. 95
WUA	Fort Andrews
WUB	„ Hancock (N.J.)
WUC	„ H. G. Wright
WUD	„ Leavenworth WUD
WUE	„ Levett
WUF	„ Monroe WUF
WUG	„ Monroe WUG
WUH	„ Omaha
WUI	„ Riley (Kansas)
WUJ	„ Sam Houston
WUK	„ Stevens
WUL	„ Totten
WUM	„ Wood
WUN	„ Worden
WUO	„ Winfield Scott
WUP	Washington WUP
WUQ	Washington WUQ
WUV	Fort Leavenworth WUV
WVA	Circle City (Alaska)
WVB	Fairbanks (Alaska)
WVC	Fort Egbert (Alaska)
WVD	„ Gibbon (Alaska)
WVE	„ St. Michael (Alaska)
WVF	Kotlik (Alaska)
WVG	Nome (Alaska)
WVH	Mulato (Alaska)
WVI	Petersburg (Alaska)
WVJ	Wrangell (Alaska)
WVL	Fort Frank
WVM	„ Hughes

WVN	Corregidor Island
WVO	Davao
WVP	Fort Drum
WVQ	„ William M'Kinlay
WVR	„ Wint
WVS	Jolo
WVT	Malabang
WVU	Manila
WVV	Puerto Princesa
WVW	Zamboanga
WVX	Cuyo
WVY	San Jose, Mindoro
WWA	s.s. China
WWB	s.s. Beaver
WWD	s.s. Bear
WWE	s.s. Manchuria
WWF	s.s. City of Para
WWG	s.s. City of Sydney
WWH	s.s. Newport
WWI	s.s. Pennsylvania
WWJ	s.s. Peru
WWK	s.s. Korea
WWL	s.s. San Jose
WWM	s.s. San Juan
WWN	s.s. Mongolia
WWP	s.s. City of Panama
WWQ	s.s. Aztec
WWR	s.s. Rose City
WWS	s.s. Kansas City
WWU	s.s. Siberia
WXA	g.s. Buford
WXB	g.s. Crook
WXC	g.s. Dix
WXD	g.s. Kilpatrick
WXE	g.s. Liscum
WXF	g.s. Logan
WXG	g.s. Meade
WXH	g.s. M'Clellan
WXI	g.s. Merritt
WXJ	g.s. Sheridan
WXK	g.s. Sherman
WXL	g.s. Sumner
WXM	g.s. Thomas
WXN	g.s. Warren
WXR	g.s. Burnside
WXS	g.s. Cyrus W. Field
WXT	g.s. Joseph Henry
WYH	g.s. General Robert Anderson
WYI	g.s. Captain Chas. W. Rowell
WYJ	g.s. General A. M. Randol
WYK	g.s. General Harvey Brown
WYL	g.s. General R. B. Ayres
WYM	g.s. James Fornance
WYN	g.s. Reno
WYO	g.s. Major Thomas
WYQ	g.s. Captain Barrett
WZG	De Russey
XAA	Veracruz de Veracruz
XAB	Campeche
XAC	Payo Obispo
XAD	Isla Maria Madre
XAE	Mazatlán
XAF	S. José del Cabo
XAG	S. Rosalia de la Baja (Cal.)
XAH	Guaymas
XBA	s.s. San Bernardo
XBB	s.s. Mexico
XBC	s.s. Mexicano
ZAR	Zanzibar

ON WAVES AND WAVE MOTION

By J. A. Fleming, M.A., D.Sc., F.R.S.

THE principal difficulty which persons who are not trained physicists find in obtaining any clear ideas of the *modus operandi* of wireless telegraphy arises from the imperfect conceptions they are able to form of the nature of an electric wave. They hear that wireless telegraphy is conducted by means of electric waves, but the words convey no definite meaning to their minds. Hence many people, otherwise very highly educated, frequently declare that wireless telegraphy and everything connected with it is to them an unspeakable mystery, even in spite of much popular discussion of it.

This difficulty arises from two causes. First, because the only things we are able to visualise very clearly are the *motions, forms,* or *relative positions* of material substances, added to which we can recover by recollection such special sensations as colours, smells, or tastes. Secondly, because the word *wave* conveys to the ordinary mind the notion of an effect which is not strictly speaking a wave at all, and hence forms a wrong starting point for a correct idea of the nature of an electric wave. The ordinary non-technical person hearing the word "wave" pictures to himself the water curling over and breaking on the rocks or beach at the seaside, or else the irregular splashing foam-crested water in a sea or channel. Properly speaking, the water which dashes up at the edge of the sea is no more a true "wave" than a house in the act of tumbling down can be called a good residential property. The best place to form right notions is to look at the surface of the sea at some distance from the coast on a bright, breezy day, when the wind is blowing towards the coast or up an estuary or long bay. We then see rounded ridges or hummocks of water chasing each other over the surface. At first sight it appears as if the surface water itself is moving. If, however, we fasten attention upon a floating buoy or patch of seaweed we shall notice that as each wave passes over it the floating object is merely lifted up and let down again, or at most has a small forward and backward motion as well.

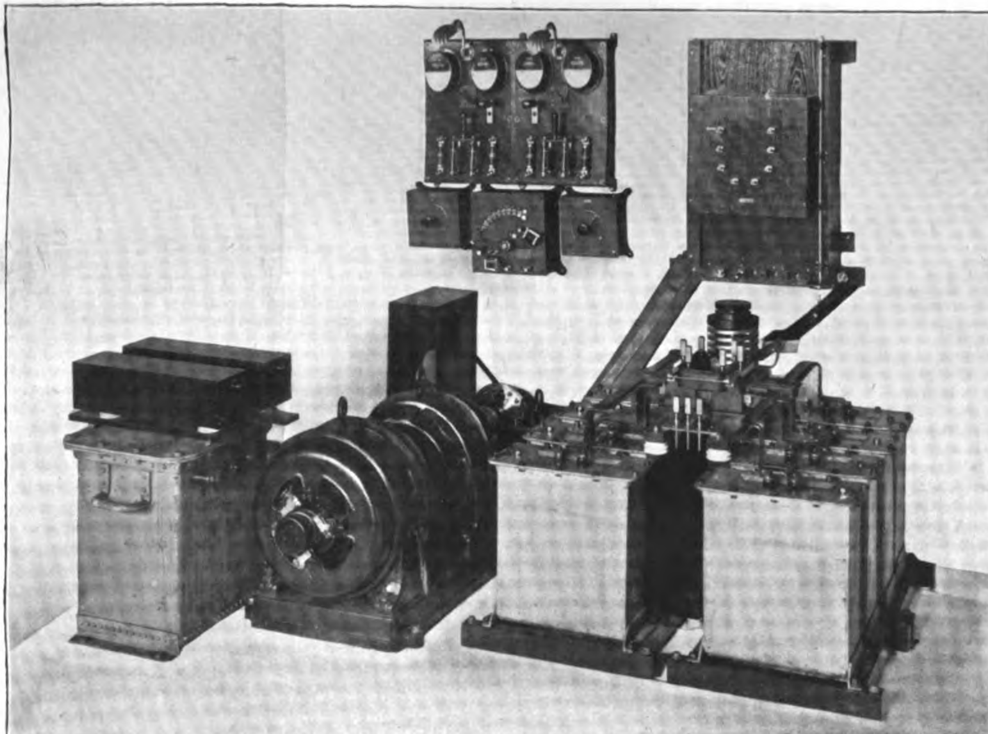
If we look at two such objects not too close together we shall see that they perform the same small oscillatory motions

successively and not simultaneously. A little careful scrutiny will thus convince us that the true motion of each part of the water is merely a small motion in a circle, being moved up, forward, downwards, and backward, and that each part performs this cycle of operations in its turn, and over and over again. The speed with which this cyclical motion is handed on from point to point is called the velocity of the wave. We migh[illegible] instance, imagine a seagull to fly along always keep[illegible] above one particular hummock of water. His [illegible] be the speed of the wave. The distance f[illegible] e next one, measured crossways or at r[illegible] of the crest, is called the *wave length.* [illegible] s are said to be long when the distance is great f[illegible] crest to crest, not when the ridges themselves are long.

Such waves on water are called surface waves; and the effect of them extends a very little way down into the sea. The same class of surface wave is produced when we throw a stone into still water in a pond or lake and notice the expanding rings of ripples which are thereby produced. This latter is a typical case of wave motion in two dimensions.

Again, if we give a jerk to the end of a long stretched cord a hump or kink travels along it, which is likewise a wave motion. Each part of the cord is lifted up and then let down successively, and the motion is handed on from point to point with a certain speed.

A large number of models of various kinds have been constructed to illustrate various forms of wave propagation. In the case of the water surface waves or the wave motion of a kink along a rope the displacement of each part of the medium, whether water or rope, is at right angles to the direction in which the wave is moving. On the other hand, we have forms of wave motion in which the displacement is in the direction of that motion. Thus, for instance, if a brass or steel wire is coiled into a spiral and the spiral suspended by threads attached to it at regular intervals, so as to support it in a horizontal direction, we have a medium in which we can propagate what are called longitudinal waves. If we give to one end of the spiral a smart blow with a piece of wood, striking the spiral end-on and not sideways, we shall thereby suddenly compress the end, and the turns of the spiral at that end will be squeezed closer together, but they immediately expand again, and therefore compress the next or adjacent turns. The result is that a wave of compression



5 k.w. Wireless Transmitting Set (Battleship Type).

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runs through the spiral. We see each part of the spiral in turn slightly compressed and then relaxed.

The same kind of longitudinal wave of compression and rarefaction takes place in air when a sound or aërial wave is produced. Suppose an explosion to take place at any point in the air. We can picture to ourselves the air round that point as arranged in concentric shells or layers like the coats of an onion. When the explosion happens it compresses the layer of air next to it, but owing to the inertia of the air the compression does not make itself felt instantaneously at all distances. The innermost layer is first compressed; then it expands back and compresses the next outer layer, and so on, the state of compression being handed on from layer to layer, and travelling outwards with a speed of about 1,200 feet a second at ordinary temperatures. The motion of each particle of air as the wave passes over it is to and fro in the line of propagation of the wave. Hence the wave is called a longitudinal wave.

A little consideration will make it evident that to produce a self-propagating wave in a medium, as contrasted with a mere wave motion or successive performance of some periodic motion by a line of particles, there must be a connection between the different elements of the medium. Moreover, the medium must have two qualities, one of *elastic resistance* to some change imposed upon it, and the other of *persistence* in doing what it is set doing. In other words, it must have elasticity and inertia. Thus in the case of air the air molecules resist being compressed, and when the compressing force is removed they fly apart. But on being set in motion they continue to move and expend their energy in compressing other layers of air. The air, therefore, can store up energy in two forms—viz., as kinetic energy, or energy of motion, and potential energy, or energy of compression. These forms of energy are interchangeable, and are continually being transformed into one another. The total energy in any volume occupied by pure wave motion is at any instant half potential and half kinetic.

If we analyse in the same manner the case of the wave on a water surface we find that the water being a heavy body not only possesses inertia, in virtue of which it stores up kinetic energy, and when set moving continues to move until it is deprived of this energy, but also the water surface resists being made unlevel. Hence when the water is heaped up in one place or depressed it tends to move so as to restore the level surface.

2 K 2

Accordingly the water surface when made unlevel stores up potential energy. It has an elastic resistance to change of level. Similar ideas present themselves in all other cases of visible wave motion.

As long as we are dealing with the case of waves on water, or in air, or on strings, we can picture to ourselves or actually see the motions of which we speak.

The moment we pass beyond this region of eyesight, or the result of eyesight, and concern ourselves with a super-material medium like the æther, the difficulties of framing adequate mental images corresponding to the words used become very great.

All the phenomena in wireless telegraphy by Hertzian waves on the system initiated by Mr. Marconi point indubitably to the conclusion that we have here to deal with a wave effect, and that these waves are not created in air as a medium and not entirely in the soil or crust of the earth, but are produced in some medium which interpenetrates matter and co-exists with the air in the space above the earth. In spite of the efforts which have been made by a certain school of thinkers of late years to render the assumption of the æther unnecessary or to throw doubts on its physical existence, it still remains the most probable hypothetical basis for certain indisputable observed effects. Hence we find much to support the assumption of some form of energy-transmitting medium which is of a more fundamental nature than tangible gravitative matter. This æther is inappreciable directly by our senses, unless we admit that the impact of certain very short waves in it called light is such direct appreciation. Nevertheless, we cannot feel it, weigh it, or confine it like gas in any vessel, and its properties have to be inferred from observed effects.

Before the date of publication of James Clerk Maxwell's great contributions to the theory of electricity it was generally assumed that this hypothetical æther must possess an elasticity resembling that of an incompressible elastic jelly-like solid, in that it can resist a shear or distortion or change of shape. Also it was assumed that it possessed inertia and therefore could store up energy as energy of motion. It followed that the only kind of waves possible in it were waves of transverse displacement—that is to say, each part of this elastic substance could be displaced a little way from its normal position by shearing, but that when released it sprang back. Hence the only type of wave motion it could transmit would be identical with that wave of

distortion producible in a mass of indiarubber or jelly. If we picture to ourselves such a jelly made up in concentric layers, like the coats of an onion, and suppose that the innermost shell makes a small movement of rotation to and fro round some axis, and that each shell in turn repeats this motion round the same axis, then a wave of transverse displacement would be propagated through the medium. Such a conception affords us, however, no explanation of electrical phenomena, and when Maxwell addressed himself to the consideration of the actions at a distance with which we are familiar in electrical work it was, in his view, essensential to make such assumptions as to the possible structure of the æther that it could be used to explain electrical as well as optical effects.

Nevertheless, he realised that we know nothing about the mechanical structure of the æther, and therefore he propounded a theory which enabled him to explain optical phenomena in terms of known electrical facts, and discarded any attempt to invent hypotheses as to the mechanical structure of the æther which would permit both optical and electrical facts to be interpreted in terms of possible mechanical motions of the æther. It is perfectly certain, however, that the only actions we can visualise clearly are mechanical movements. We cannot think of the æther at all or use it as an hypothesis to explain observed effects unless we are able to make a *working model* of the æther structure in terms of the concepts of mechanics. Hence innumerable attempts have been made to represent the æther in imagination by structures made up of inter-connected cog-wheels and idle wheels or gyrostats, or fluid vortices, or in a dozen other ways, to imagine a mechanism which would act under mechanical forces as we find the actual æther does under electrical and magnetic forces. It does not follow, however, that, because we can imagine a mechanism that would produce the effects we find in Nature, the effects are actually produced in this way.

Hence a scientific hypothesis cannot at any time be regarded as giving us absolute and final truth on any matter. It is at most merely a shadow of the truth. It provides a language in which we can describe and connect phenomena, or it gives us a suggestion and incentive for further experimental work. Whatever hypothesis for the time holds the field as regards the structure of the æther, it must certainly enable us consistently to explain wave motion through it. The characteristics of wave motion are that the energy entirely leaves the radiating body and exists

for some time, long or short, in the medium before reaching the receiving agent. Also that energy exists in two forms which alternate periodically both in space and in time along the line of propagation.

Maxwell employed the purposely vague term *electric displacement* to denote the change produced in the æther near an electrified body, and he showed that when the electric displacement at any point was changing there was produced around it all along an embracing line another state called *magnetic flux,* similar to the condition of space near a magnetic pole. Working from this starting point, he was able to show that a sudden application of electric force or its sudden removal resulted in the propagation through the æther of waves of electric displacement and magnetic flux. These two effects correspond in the case of æther waves with the state of compression and with the velocity of the air particles in the case of wave motion through the air, or with the state of elevation or depression and with the velocity of the water particles in the case of a surface-water wave.

Maxwell was able to show, and abundant confirmatory proof has since been obtained, that the velocity of such an electromagnetic wave through the æther would be identical with that of light—viz., about 300,000 kilometres per second.

The term electric displacement, as used by Maxwell, is perfectly definite in a mathematical sense, and we are therefore able to express in exact mathematical form the relation between the change of electric displacement and the resulting magnetic flux, and also the corresponding inter-connection between change in magnetic flux and electric displacement; but these terms do not of themselves raise in the mind any definite mechanical images. In one sense it is better that they should not do so. Strange as it may appear, the more definite we try to make our conceptions of Nature's machinery in this respect, the less likely are they to be true. The actuating machinery of Nature is hidden from us. We are like spectators at a play. We see the changes of scene and effects produced upon the stage, but the exact means by which it is all brought about is concealed from us. The first question which presents itself to us in considering wave motion through this æther is—What is the nature of the elasticity of the æther? What kind of change in it does it resist?

This elasticity is certainly not a resistance to compression or extension or even shearing, like that of a gas or solid. Many

converging lines of thought indicate as likely that the æther elasticity is an elastic resistance to the twisting or rotation of certain ultimate elements of it. Just as a gyrostat or heavy top in rapid rotation resists being twisted owing to its gyrostatic stiffness, so Lord Kelvin, Sir Joseph Larmor, and others have suggested a structure for the æther on this basis.

Corresponding to this, we must assume that these elements of the æther can move over each other without friction, so that we have possible in it frictionless flow accompanied with resistance to absolute rotation in each particle. We must also postulate that æther flow or motion involves friction energy associated with it. We have, then, a possible storage in it of potential energy, or energy of twist, as in a coiled spring, and energy of motion. At the same time there must be some linkage or connection between the particles of the æther whereby rotation of a line of particles, or twist round any line, is accompanied by a flow of æther round the line.

Another view of the nature of an electric wave has recently come to the front which is founded upon a suggestion of Faraday's, developed in detail by Sir J. J. Thomson more recently. We now know that what we call electricity is atomic in structure. That means to say that electricity is made up of particles which cannot be divided without destroying it. The ultimate atom of negative electricity is called an *electron,* and is as much smaller than an atom of hydrogen gas as the latter is smaller than a very very small pin's head. From the electron proceed in all directions lines of æther twist, which are called lines of electric force. We may picture it to ourselves as like a golf ball, having long straight wires stuck into it. All conducting bodies have free electrons mingled with their chemical atoms, and in their ordinary unelectrified condition these electrons move hither and thither in all directions. If, however, a high frequency electromotive force acts on the body, these electrons are caused to swing to and fro in an identical manner. When an electron is suddenly started into motion or suddenly stopped, the attached lines of force lurch backwards or forwards like passengers in a motor-'bus which is suddenly set going or arrested. The result is to produce a kink or bend in the lines, and the effort of these lines to straighten themselves causes this kink to run outwards along the line. If a number of electrons in a wire perform these oscillations simultaneously the result is to form a series of loops of æther twist or electric displacement which are transverse

or lie across the radiating lines of force. These loops are shot outwards with the velocity of light. Hence in a wireless ærial or antenna the physical processes at work are as follows:— The transmitter, whatever may be its nature, causes the free electrons in the ærial wire to oscillate to and fro with great rapidity all at the same time. The vibrations produced thereby on the radiating lines of force starting from each electron combine to produce one single vigorous ætheric oscillation, which consists in the emission from the ærial wire of these loops of electric displacement. This process constitutes what we call electric radiation. It is essentially of the same nature as visible light, but differs from it only in wave length.

In the case of an ærial wire which is "earthed," or connected to the earth at the lower end, there is in addition to this space wave or wave in the æther an "earth" electric wave propagated through the crust of the earth. This is proved by the fact that a high collecting ærial is not absolutely necessary for reception in wireless telegraphy. The signals from the Eiffel Tower Wireless Station in Paris can be detected in London merely by using as collector any metallic mass, such as a galvanised iron dustbin, which is insulated from the earth, the receiver being connected between this mass and the earth.

In the case of long distance wireless telegraphy we are probably concerned with electromagnetic waves of both types—viz., true electro-magnetic waves propagated through the æther around the earth, partly arriving directly and partly after reflection or refraction by masses of conducting air in the upper atmosphere. Also the effect reaches the distant station as an electro-magnetic wave which is propagated along the surface of the earth, in the same manner that it travels along a wire.

The terrestrial atmosphere is therefore the seat of waves of many kinds. We have not only long ærial waves in the air itself, produced by winds or explosions, but the co-existing æther waves of short wave length, about one fifty-thousandth of an inch in wave length, which constitute light. Then there are in addition frequent natural but irregular vagrant electric waves of great wave length, produced by atmospheric electric discharges, such as lightning, or created, it may be, by extra terrestrial causes, such as explosions in the sun. Lastly, there are the countless long electric waves now intentionally made in telegraphic work, which cause a turmoil in the former comparative ætherial calm.

The mysterious æther transmits all these waves with the same velocity of 300,000 kilometres per second. In order that it may do this the ratio of its elasticity to its density must be at least 3,600 million times greater than that of steel. It would occupy too much space to attempt to sketch in merest outline how such qualities can be combined with perfect non-resistance to the motion of material substances through it.

Suffice it to say that the electronic theory of matter provides a clue to the explanation of this mystery and to the relation of matter to æther generally. The properties of this basal medium, the æther, have occupied the thoughts of some of the greatest of modern thinkers, and the problems raised by the achievements of long distance wireless telegraphy have brought forward many other more intricate questions for consideration.

THE FUNCTION OF THE ATMOSPHERE IN TRANSMISSION.

By J. Erskine-Murray, D.Sc.

An interesting article by Dr. Eccles on certain aspects of transmission through the atmosphere appeared in the Year Book for 1913, the treatment of the subject being mainly from the point of view of his own and other physical theories for the explanation of "freak" transmissions. In the following pages I have attempted rather to analyse typical cases of unusual wireless transmission and to deduce from these, in conjunction with the known and fundamental physical facts of the case, a true idea of the function of the atmosphere in transmission without the use of any explanatory hypotheses.

That the atmosphere ought to have some slight influence on the transmission of electric or "æther" waves from place to place on the earth's surface is obvious when one recollects that the air, though a very good insulator at pressures such as exist at the earth's surface, is nowhere a perfect insulator, and has quite different electrical qualities at the low pressures which occur at heights above thirty or forty miles to those it possesses at lower elevations.

Electrical waves must necessarily have a good insulator to pass through; they are guided by a conductor, but do not pass through it, only diffusing slowly into it and being dissipated as heat in the conducting material. The better the conductor the smaller is the depth of penetration of the waves into it and the less the loss of energy on this account. At the same time every conductor, whether a wire or a great mass like the earth, does conduct—that is to say, the electrical disturbance follows, and is guided by its surface.

In Hertz's experiments, and in Mr. Marconi's earliest form of apparatus true radiation took place—*i.e.*, there was a free and unguided passage of an electric disturbance from one conductor to another conductor through an insulating medium, the air, in which both were situated.

In modern Wireless Telegraphy free radiation does not take place when the stations are situated on land or sea, for the receiver is actually in direct connection with the earth and the

latter forms part of the transmitter. Modern wireless is thus merely transmission from one part of a conductor to another part of the same. No return circuit, such as is used in ordinary telegraphy, is needed, because the disturbance is not continuous but alternating, and is of comparatively small wave length. I may quote from the 1907 edition of my handbook a definition which puts the matter succinctly; it is as follows:—

> "Reduced to its simplest terms, the modern wireless telegraph is a large conducting sphere (the earth) with two conducting excrescences on it or near its surface (the aerial conductors). In one of these a sudden oscillatory movement of electricity is started, which spreads over the surface, causing to-and-fro currents in the other wire as it passes."

It will be understood, therefore, that, as these have been my views since 1898, I was not one of those whom Dr. Eccles, in his article in last year's YEAR BOOK, speaks of as being surprised at Mr. Marconi's success in transatlantic transmission round the curve of the world.

If the lower atmosphere were as conductive as the sea is, wireless telegraphy from place to place on the earth's surface would be impossible, for the electric waves would not penetrate such a material to more than a few yards from the transmitter. Thus Wireless Telegraphy between completely submerged submarines is impracticable. The same is true in regard to wireless transmission in mines. Where the rocks are dry, and insulating, transmission is possible through them up to a mile or two; but where they are wet and therefore conducting wireless telegraphy is impracticable. The non-conducting layer of air in contact with the ground and rising to some thirty miles above it is thus the stratum through which the electric waves can pass in travelling from station to station. Above lies the less dense air, which is certainly not a good insulator, and therefore must either absorb or reflect the waves which come up to it from the transmitter. There is now experimental evidence that at night this upper layer does reflect the waves down again, and thus signals are received at greater distances than in the daytime; and Dr. Austin is of opinion that even in the daytime the action is not always absorption only, but that occasionally there is a slight strengthening of the signals by reflection.

The first suggestion, of which I am aware, that indicates the importance of the upper atmosphere in the transmission of

electrical waves over the earth's surface is contained in a paper which the late G. F. Fitzgerald read at the British Association Meeting in 1893. In discussing the probable period of an electrical oscillation of the earth as a whole, he remarks that "The period of oscillation of a simple sphere of the size of the earth, supposed charged with opposite charges of electricity at its ends, would be almost one-seventeenth of a second; but the hypothesis that the earth is a conducting body surrounded by a non-conductor is not in accordance with the fact. Probably the upper regions of our atmosphere are fairly good conductors." He then proceeds to calculate the period of oscillation, considering the earth and upper atmosphere as two concentric spherical conductors, and finds that if the height of the region of the aurora, *i.e.*, of the conducting layer, be 60 miles, the period comes out at 0·1 second; while, if the height be 6 miles, the period becomes 0·3 second.

At the time this was written Wireless Telegraphy, in the modern sense, had hardly been thought of, and no application of Fitzgerald's idea was made to radio-telegraphy until 1902, when A. E. Kennelly in the *Electrical World* suggested that an upper reflecting layer might be the cause of the abnormally long ranges occasionally attained by night. Oliver Heaviside also, in his article on the Theory of Electrical Telegraphy ("Encyclopædia Britannica," 10th edition), says: "There may possibly be a sufficiently conducting layer in the upper air. If so, then waves will, so to speak, catch on to it more or less. Then the guidance will be by the sea on one side and the upper layer on the other."

It is clear, therefore, that, in the opinion of Fitzgerald, the upper conducting air actually existed, and that Kennelly and Heaviside looked upon its existence as probable.

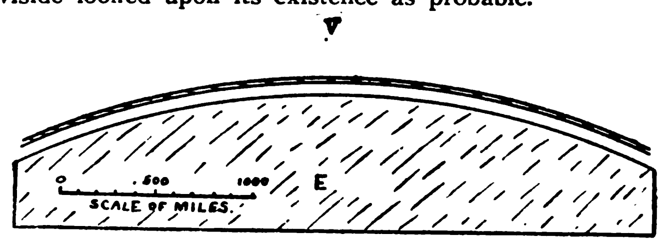


Fig. 1.

A portion of the Earth and Atmosphere, to scale E, the Earth, V Outer Space The shaded parts are conductors, the strip between them being the dielectric of Wireless Telegraphy [From Erskine-Murray's Handbook of Wireless Telegraphy 1907]

The diagram, *Fig.* 1, which forms an illustration to the chapter on transmission in the first and succeeding editions of the

writer's "Handbook of Wireless Telegraphy," published at the commencement of 1907, was arrived at from similar considerations in combination with the known facts of the conductivity of gases at low pressures, of the height of the auroral discharge and of the constant presence of ionisation in the upper atmosphere. It was thus an immediate deduction from the knowledge available at the time.

As regards the ionisation of the upper atmosphere, I may say that, as early as 1892, I wrote a paper in which a calculation was made of the currents in the upper atmosphere which would be necessary to account for certain magnetic storms, and suggested that these currents might be due to streams of electrified particles entering the atmosphere from the outside. A great deal of work on similar lines has been done lately by Birkeland. That ordinary sunshine containing ultra-violet light ionises air was well known, as also the fact that ionisation does not die out at once.

The diagram indicates that if the under surface of the upper conducting layer were sufficiently sharply defined, the waves would be reflected downwards and might, therefore, increase the strength of signals received, the wave form becoming ultimately —*i.e.*, at great distances—cylindrical instead of hemispherical, and therefore giving a much slower reduction in the strength of received signals than would occur if the waves were free to extend into upper space or were absorbed by and dissipated in the upper layers. I consider that the existence of this upper conductive layer is no longer a matter of doubt, and that the problems now in the process of solution involve only its form and functions. To be able to discuss these we must leave for the meantime the physical side of the question and look into the evidence obtained in the actual working of Wireless Telegraph Stations.

The first time that an obviously atmospheric effect was noticed was in 1902, when Mr. Marconi received signals from Poldhu on board the s.s. *Philadelphia* at nearly twice as great a distance by night as by day.

Since the conductivity of the surface of the sea is not appreciably different by day and by night it is evident that the cause of this increase of distance of transmission at night must be some atmospheric variation. Mr. Marconi suggested that at the time the effect might be a local one, *i.e.*, a loss of energy at the transmitting aerial due to ionisation by daylight of the air in

its immediate neighbourhood. This theory, however, does not fit in with the more recent observations of the phenomena which clearly indicate that the cause is situated in the atmosphere intervening between the stations, and is not due to variations in the amount of energy radiated.

Take, for instance, Edward's observations on transmission by day and night on the coast of British Columbia, and in particular the case of communications between Victoria, Pachena Point, and Ikeda Head. These three stations lie in nearly a straight line, Pachena Point being about 75 miles and Ikeda Head about 400 miles N.W. of Victoria. Electric waves in transmission from Victoria to Ikeda Head thus pass Pachena, and if they travelled by the shortest route, *i.e.,* along the earth's surface, should be received there.

As a matter of fact, however, with the small power station originally installed, it was very difficult to communicate between Victoria and Pachena at all, either by day or night, whereas communication was easily maintained between Victoria and Ikeda Head almost every night, though not by day.

There appears to be only one rational conclusion which can be drawn from these observations—viz., that at night the waves which reached Ikeda Head actually passed Pachena high overhead without approaching the ground on which the station stands; that is to say, they rise from Victoria and are bent down again after they have passed over Pachena Point. There is no other way by which they could get to Ikeda Head without affecting the intermediate station. We have thus a direct proof from actual wireless operations that there must be some stratum of the upper atmosphere which, at least by night, is not transparent to electric waves, but reflects or refracts them downwards from its lower surface.

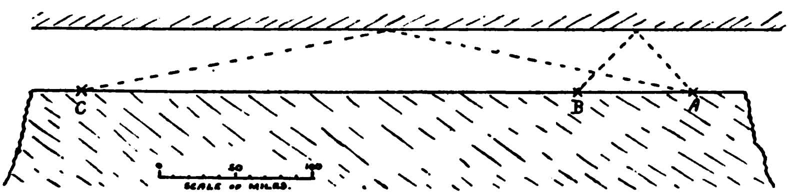
From the consideration of the physics of the atmosphere and from actual wireless observations we have thus obtained two quite independent proofs of the existence of the upper conducting layer depicted in *Fig.* 1.

The above are, of course, only instances taken from a very large number of observations, all of which go to prove the existence of a strengthening of signals due to reflection from the upper atmosphere. These "freak" transmissions occur in all latitudes, but mainly in the fine weather belts which surround the world between latitudes 20° and 45° on both sides of the Equator. It is also there that the atmosphere is, as we know from the work of meteorologists, in a comparatively steady con-

dition, such as must favour the formation of a smooth reflecting layer. There is also evidence which shows that stormy weather is unfavourable to transmission.

It is notable that many of the greatest distances of "freak" transmission have been in large part over land and indeed over high mountains—a further proof that in these cases the main conductor is not the earth, but the upper shell.

It is also a fact that signals between stations at a comparatively small distance from one another are not appreciably strengthened at night, and this further confirms the idea that the increase at greater distances is due to reflection. In the case for instance of Victoria and Pachena Point the angle at which the waves would have to be reflected from the upper layer is about 45° or more in order to reach the latter station. So high an angle is, of course, very unfavourable to reflection, and a very small proportion, if any, of the waves received at Pachena



A, Victoria; B, Pachena Point, C, Ikeda Head

Fig. 2

Point could come that way. For Ikeda Head the angle would only be about 10°, which is very much more favourable; hence, as the phenomenon of better night transmission is observed at the latter, reflection is indicated.

We may take it, therefore, that it is practically certain that during the night the waves are conducted to great distances by two conducting surfaces, the earth and the shell outside it. The argument put forward by Dr. Eccles against conductive transmission—viz., that a high receiving aerial is better than a low one—is really fallacious and neglects Poynting's proof that, in all electrical transmission, the energy travels *via* the dielectric and not in the conductor. Of course, a higher aerial will show greater energy in the receiving instruments in any case, for the integral effect of the electromagnetic forces on it will be greater than that in a small one, whether the waves be conducted or free. I have demonstrated this many times in lecturing on the subject by using a long horizontal straight wire to represent the

conducting strip of ground between the transmitting and receiving stations, with two vertical wires attached to it as aerials.

It seems therefore that at night the lower surface of the conducting shell is often well defined, thus becoming a good reflector, while during the day the transition from the upper and conducting to the lower and non-conducting air is gradual—the surface in fact becomes fuzzy and incapable of giving a clear reflection.

We now come to the curious phenomena which take place at sunrise and sunset. Let us see what function the atmosphere performs in these after stating generally the results which have been deduced from Mr. Marconi's interesting observations at Clifden and Glace Bay and from those of later workers.

In a paper on the "Daylight Effect in Radio-Telegraphy," read to the Institute of Radio Engineers in July, 1913, Professor A. E. Kennelly sums up the experimental facts, and shows, as he says in his summary, that "changes of intensity of signals near sunrise and sunset are explained by reflecting effects which may be expected at the boundary surface or 'shadow wall' between darkness (air of small conductivity) and illumination (ionised air of marked conductivity)."

This is good if it applies only to the middle atmosphere, below the layer which as we have seen must be a good conductor even at night, and above the lower layers which under no conditions ever become appreciably conductive; but it neglects the fact that there are also long night ranges to be explained which demand something essentially better than merely a non-conducting atmosphere.

The real effect is therefore something like that shown in *Fig.* 3, a figure which I have frequently drawn on the blackboard for the benefit of a class during the past six years.

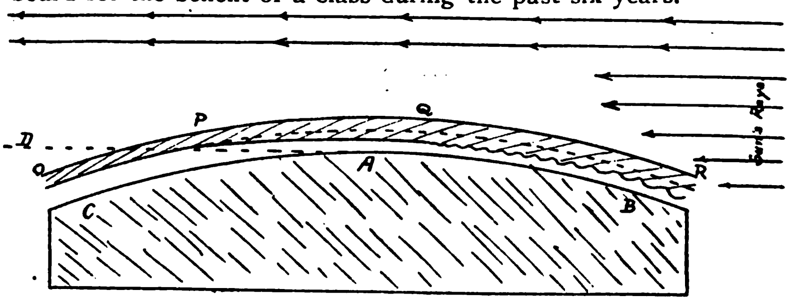


Fig 3.

CAB, The Earth: OPQR, the Conducting Shell; AD, line dividing Sunshine, above, from Darkness below. A, Station where Sun is just rising.

I have indicated that over the station A, at which sunrise is just taking place, the conducting shell is at least as sharply defined as during the night, and is, therefore, capable of reflecting; while at B, where the sun is high, the under surface of the shell is indefinite and no longer reflects. Between P and Q the shell slants downwards towards the earth, forming what Kennelly calls the shadow wall. It therefore strengthens forward radiation or condenses the received waves at A. Between O and P the shell is horizontal, as also between Q and R.

In order to follow the variations in strength of received signals which sunrise produces it is necessary to suppose that the earth, represented by the lower part of the diagram, rotates slowly clockwise. The stations will then pass from where, in darkness, the height of the shell is great to where, in full daylight, it becomes lower and less well defined; and in their passage their positions relative to the shell will indicate the variations in signals.

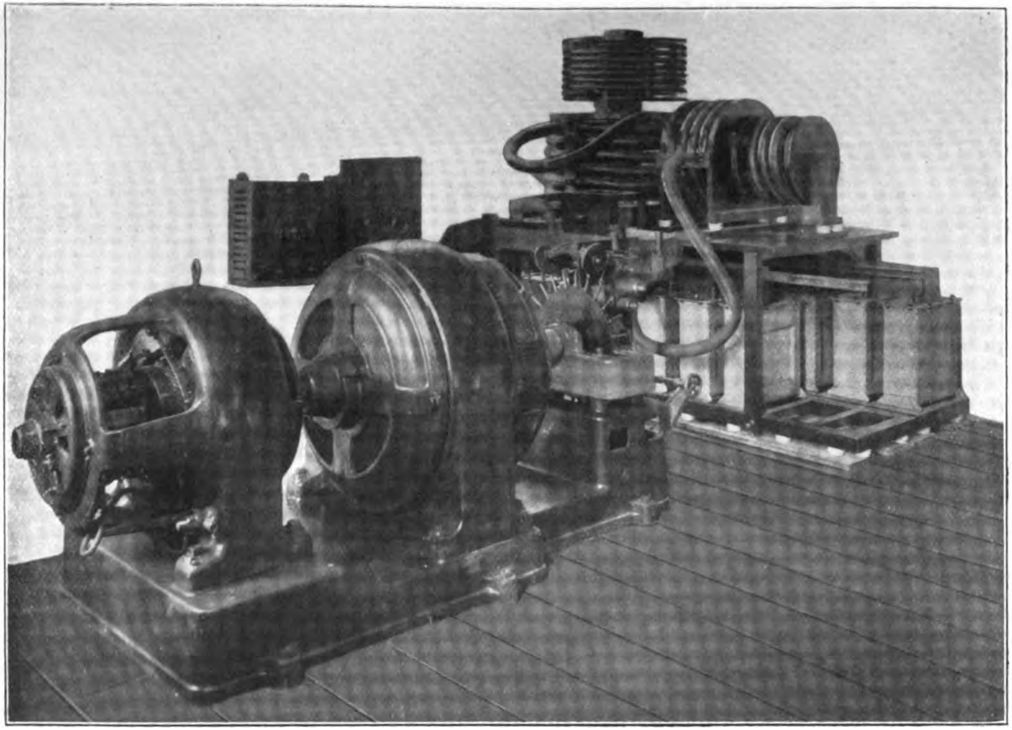
To study the sunset effect we may turn the earth counter-clockwise, starting with both stations in full daylight—*i.e.*, on the right—and turning them gradually over into darkness. The point of view will, in this case, be from above the North Pole, while in the use of the diagram to illustrate sunrise it was from above the South Pole.

As Dr. Kennelly points out, the boundary between light and darkness is a line which is only due north and south at the times of the Equinoxes. At other times of the year it has a northerly and easterly or northerly and westerly slant, according to the season of the year. This boundary line is, in fact, a great circle of the globe, the axis of which is always directed towards the sun and therefore cuts the surface of the globe at some point on the Ecliptic. Sunrise and sunset effects, therefore, vary from month to month, and depend not only on the times of sunrise and sunset, but also on the angle between the fixed great circle along which transmission takes place from the one station to the other and the great circle separating day from night.

In conclusion, I would suggest that there is another factor in the case of which no account has hitherto been taken. This is the possibility that there may be resonance to some of the natural wave lengths of the oscillator, consisting of the earth and the shell. These wave lengths are many in number, and

include a range of waves of lengths h, 2h/3, 2h/4, etc., etc., where h is the distance between the earth and the shell.

Thus, if the height of the shell be 50 km., these natural wave lengths would be 50 km., 33·3 km., 25 km., and so on; while if the height were different the whole series would be different. We have here, therefore, another possible explanation of the fact that, both with damped and undamped waves, it has been observed that at certain times certain wave lengths are more easily transmitted than others. I would suggest that, although this may be due to interference of direct and reflected waves, it may also be due, in part at least, to a change in the height of the shell, whereby the natural resonance wave lengths of the terrestrial oscillator are altered.



25 k.w. Wireless Transmitting Set.

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THE MEASUREMENT OF THE STRENGTH OF WIRELESS SIGNALS

By E. W. MARCHANT, D.Sc., M.I.E.E.; David Jardine Professor of Electrical Engineering in the University of Liverpool.

THE amount of energy received by a wireless antenna, when audible signals are received in a detector, is so small that the accurate measurement of the strength of these signals requires apparatus of very great sensitiveness. It has been estimated by Austin that the smallest power that can be detected in a receiving antenna with a heterodyne receiver is about 150 micromicrowatts, while for strong signals, such as would give good commercial working, the power is about 60,000 micromicro-watts. In order to obtain good quantitative results, which can be used for absolute measurements, it is very desirable that the aerial should be of definite form, and should be as free from obstructions (such as buildings and towers) as possible. The results obtained from stations not favourably situated are valuable from the point of view of giving comparative results, but are of no use for absolute values. The other essential for the receiving system is a satisfactory earth connection. Many examples may be cited of the effect a variable earth resistance may have on the strength of received signals; one of the most interesting is a case quoted by one of the engineers of the Marconi Company, Mr. Gilmour, of a station in Spain where the signals were weak on certain days in the dry weather, but were greatly improved by pouring water over the earth plates. In order to obtain consistent results it is necessary that the resistance should be as constant as possible. When the earth is made by plates buried in a fairly insulating non-porous rock, the earth is usually fairly constant, but in porous ground, where the climate is such that there are long periods of wet weather followed by long periods of dry weather, the earth resistance may easily vary within wide limits. Where water pipes are available a good plan is to make the earth connection to them either direct or by having a large earthed plate laid on the ground connected to them. For accurate work the earth resistance of the aerial should be checked by observations of the decrement, by some of the well-known methods

for estimating this quantity. For accurate measurement of signals of known wave length the receiving circuit for the signals must be weakly coupled to the aerial. This is essential if proper selectivity is to be obtained. The coupling on the receiver circuit should not be much more than 5 per cent., and, generally, the weaker the coupling the better. The Marconi multiple tuner should be an exceedingly useful appliance in connection with accurate tests of this kind, though the author has had no experience of its use for this purpose. In order to obtain strong signals in the secondary circuit it is necessary, if the coupling is weak, that the decrement of the secondary circuit (see Fig. 1)

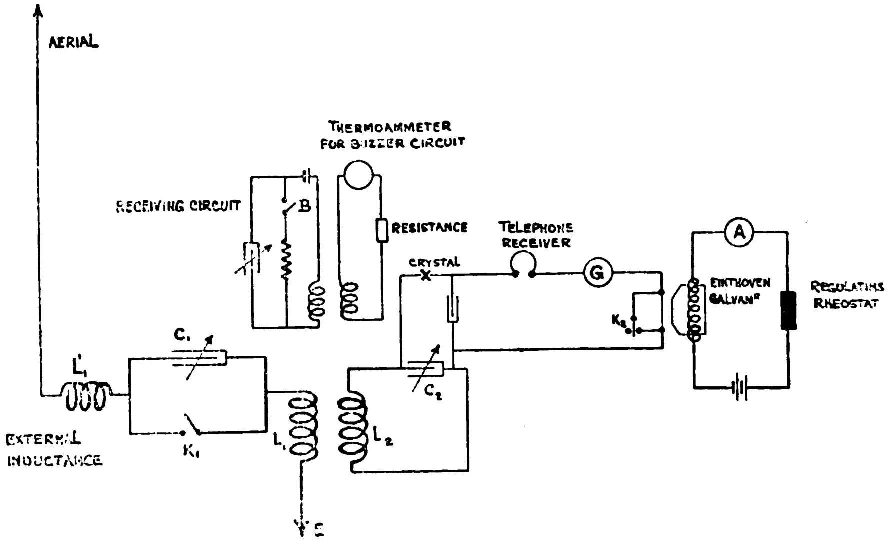


Fig. 1.

should be made as low as possible, otherwise the signal strength will rapidly diminish as the coupling is weakened. In order to reduce this as far as possible the secondary circuit should not be made of too fine wire. For ordinary purposes it is desirable to use wire of about No. 24 S.W.G. The arrangement of the coils to provide the necessary variable coupling may be any of the ordinary types, either with one coil sliding on a frame inside the other or with one coil arranged so that it will turn inside the other, an arrangement similar to that used in many forms of standard variable inductance. The most suitable form of detector depends to a large extent on individual preferences. Those who

have used them speak highly of the liquid baretter; the author, from the experience he has had with these detectors, is inclined to think that they are not the most reliable for accurate and continuous measurements. The Fleming valve detector, or audion, is not suitable for quantitative tests, since the small variation in the amount of air in the bulb due to the heating of the glass appears to affect its sensitiveness. Most experimenters use some form of crystal detector, of which the best known is the

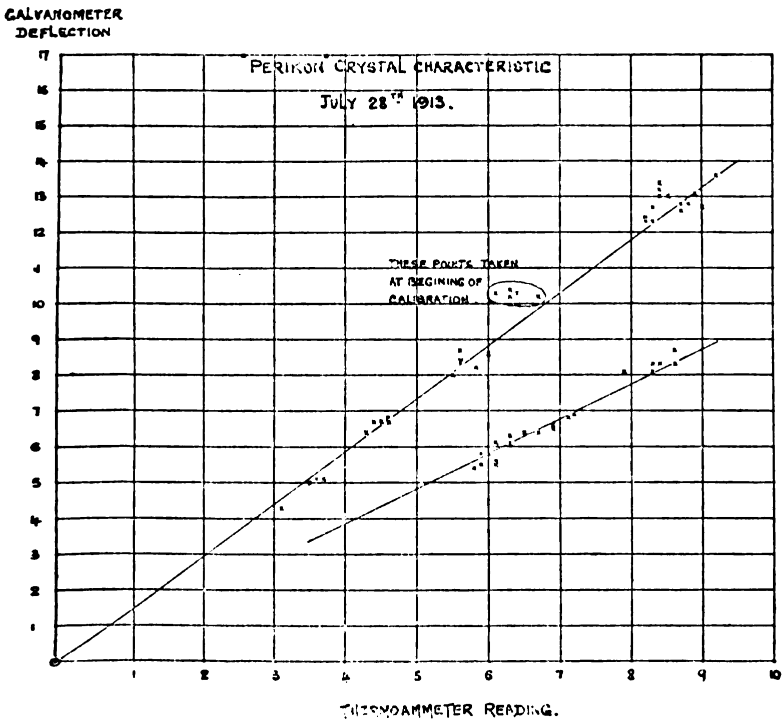


Fig. 2.

perikon, in which two crystals, one of zincite and the other of chalcopyrites, are connected in series with a block condenser across the condenser of the secondary receiving circuit. The arrangement of this detector is shown in Fig. 1. Another excellent combination is zincite-bornite. The bornite—or, as it is often called in this country, erubisite—is not quite so hard as chalcopyrites, and though pieces of it may be found which give as great sensitiveness as the perikon, it does not last so well, and

it is more affected by atmospherics. On high aerials, such as the Eiffel Tower, Com. Ferrié has said that crystal detectors are useless for accurate measurement, and he prefers, under these conditions, the liquid baretter.

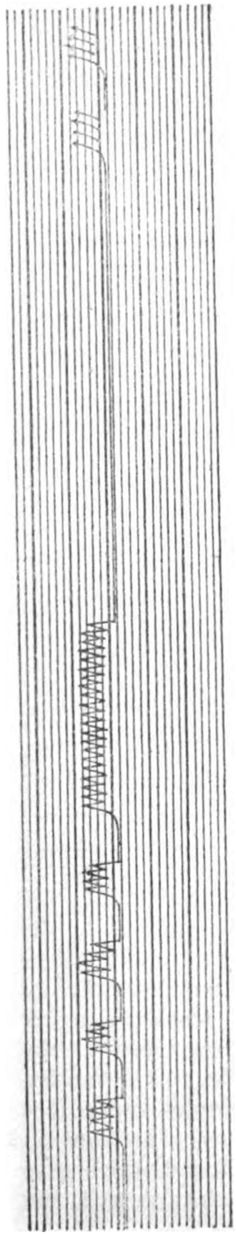


Fig. 3. Record of Time Signal received in Liverpool from Paris, June, 1913.

The perikon detector gives a current in the circuit to which it is connected which is proportional to the square of the current in the oscillating circuit. This relation also holds good in detectors using zincite and bornite, and is interesting as it indicates that the action of this form of detector is largely thermal. A theory of this kind was put forward some years ago by Dr. Eccles, who has since developed it in several papers. In some determinations made in Liverpool between the current in an oscillating circuit supplied by a battery and buzzer, and the corresponding current in a detector circuit, the relation was found to be almost exactly a square law. These results are given in Fig. 2.

It follows from this that the galvanometer deflection with a crystal detector will be proportional to the power received on the aerial, and variation observed in the galvanometer will therefore give, directly, the amount of variation of absorption by the atmosphere. The current in the receiving aerial will be proportional to the square root of the galvanometer readings.

Attempts have been made to estimate the strength of signals received, by telephone measurements instead of by using a galvanometer, and it is evident that measurements made in this way would be much more convenient to carry out. Austin has suggested that the telephone should be shunted by a resistance, and the value of this resistance continuously reduced until the signals were inaudible in the telephone. The signal strength may then be represented by an audibility factor which is measured by

the ratio of $\frac{R + Rs}{Rs}$ where R is the impedance of the telephone receiver to the spark frequency used, and Rs is the resistance of the shunt. Austin states that the strength of signals measured in this way is the same as when found by a galvanometer, *i.e.*, that the loudness of a signal in a telephone, as measured by the shunt method, is exactly proportional to the deflection of a galvanometer placed in the same circuit. The shunted telephone method may best be carried out by using a resistance box in which all the resistances are controlled by a single dial arm. Thirty or forty studs are sufficient, giving degrees of audibility varying by 20 per cent. The inductive resistance of the telephone depends on the spark frequency. For example, with a 2,500 ohm. telephone and blocking condenser of 0·02 mf. and a spark rate of 1,000, the impedance is approximately 5,000 ohms. With low spark frequencies the "inductive" resistance approximates to the direct current resistance.

This method of measurement, though it gives excellent results in the hands of skilled experimenters, is one which is not as reliable as the galvanometer method. The readings obtained must clearly depend on the sensitiveness of the hearing of the individual making the test, and unless some standard of sensitiveness of ear is available such measurements are liable to wide variations from time to time. Also, it is difficult to determine exactly when sound becomes inaudible. The standard of audibility usually employed is that for which dots and dashes become indistinguishable from each other.

In making accurate measurements, therefore, some form of galvanometer would appear to be very advantageous, but this should always be used in series with a pair of receiving telephones, in order to ensure that the signal being measured is that which is desired. One of the greatest difficulties in obtaining exact measurements is the elimination of strays due either to atmospheric disturbances or to badly tuned amateur transmitting sets, and, unless precautions are taken to detect their influence, serious errors may be made in the measurements. The ordinary galvanometer, in order to obtain a sensitiveness great enough to measure the current, is usually designed for a fairly long period of swing. M. Abraham has designed a special form of moving coil galvanometer, however, which has great sensitiveness and a comparatively short period.

When the ordinary galvanometer is used, considerable difficulty often occurs in making measurements, and the readings may

be spoilt by an atmospheric which comes in at the instant of making the test. A good deal may be done in the direction of eliminating atmospherics by suitable design of the receiving circuit; a very loosely coupled receiver with small decrement in the receiving circuit is much less affected by atmospheric disturbances than one in which tighter coupling is employed, but under the best possible conditions atmospherics are always liable to give trouble. The most satisfactory way of making measurements is to have a galvanometer of great sensitivity, and having a very short period of swing. The author has had the advantage, during the last year, of using an Einthoven, quartz fibre, or string galvanometer, with photographic recording apparatus, and has found this of great value for accurate measurement. The signals received are sent through this galvanometer as well as through the ordinary receiving telephones in series with a crystal detector; the motion of the quartz fibre corresponding with any signal is recorded on a moving photographic plate. A typical record for the signals received from the Eiffel Tower is chosen in Fig. 3. Not only does this device give an accurate record of the signal strength, but it also enables the variation in strength of individual sparks to be detected, and the strength of the received signal can be measured with considerable accuracy. The record so obtained shows at once the signal that is being measured and whether the amount of deflection is affected by atmospheric discharge. The accurate observation of signal strength may be expected to throw considerable light on the factors which are of importance in wireless signalling.

Among the contrivances that have been used for observing wireless signals, an arrangement of a frog's leg detector working in conjunction with a crystal may be mentioned. Experiments have been made with this arrangement by M. Lefeuvre, of the University of Rennes, and were described recently by him (*Fig.* 4). The current from an electrolytic detector was sent through a pair of receiving telephones, and part of this current was shunted through the nerve-muscle preparation. The contraction of the muscle was recorded on a revolving drum. There was a time lag of about 1-100th of a second between the reception of the signal and the contraction of the muscle, but the response was quick enough to enable the Paris time signals to be distinguished. The long dashes gave for examples a series of contractions of about the same magnitude, while the — . . . . signal gave a big contraction, followed by four smaller ones, lasting for a much shorter

time. These records are mainly of interest in exhibiting the great sensitiveness of this arrangement for detecting small currents, and cannot be relied on to give accurate quantitative results.

Some observers—notably, Duddell and Taylor—in their original tests have used a thermoammeter of sufficient sensitiveness to measure the aerial current directly. With long-distance signalling the sensitiveness of this instrument has to be very great, as was shown earlier; and, further, it is exceedingly difficult with such an instrument to get a quick period of swing and at the same time great sensitiveness. When working on large aerials

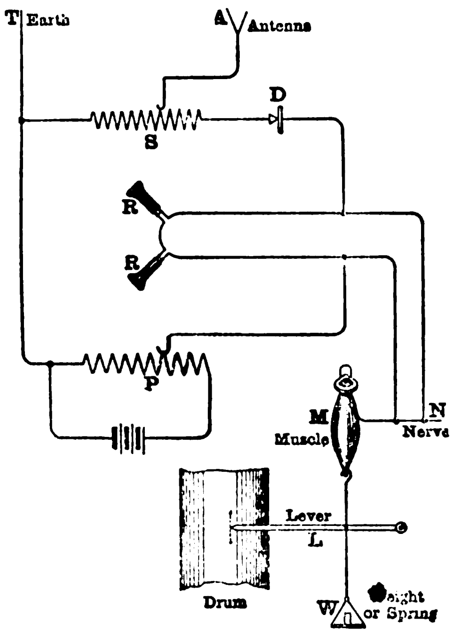


Fig. 4.

and on long wave-lengths the trouble with atmospherics becomes very serious, and such an instrument is not a satisfactory way of getting accurate records, except over short distances and with low aerials. It has the advantage of great simplicity, since, in order to obtain comparable results, it is only necessary to obtain a measurement of the aerial currents; the coupling between aerial and secondary circuit and the decrement of the secondary circuit do not require to be taken into consideration.

A further difficulty in using this arrangement is to eliminate signals which it is not desired to measure. A considerable selec-

tivity may be obtained by tuning the aerial to the received wave-length, but the selectivity so obtained is nothing like so great as that found with a weakly coupled receiving circuit. When working in almost any district in England at the present day, a considerable number of messages are always being received, and it is almost impossible at the present time to obtain measurements direct on the aerial, except on very long wave-lengths. Unfortunately, on long wave-lengths atmospheric discharges become a serious matter.

The most satisfactory arrangement for accurate measurement is some form of rectifying detector in conjunction with a short-period galvanometer, the detector being standardised by a buzzer circuit giving a known oscillating current.

PROBLEMS OF WIRELESS TELEPHONY

BY C. E. PRINCE.

FOR a long time past—long, that is, for the short but brilliant life-history of "Wireless"—the subject of the wireless telephone has been an attractive one for investigators. The possibility of launching through space, on the wings of the ether waves, not intelligible messages only, but the very speech and tones of the living voice, seems almost like a fairy-tale; and, indeed, no familiarity with the subject ever quite robs it of its wonder and romance.

Essentially, the wireless telephone is simply an ordinary wireless sender and receiver, in which the emitted energy, instead of being broken up into groups of signals sharply changing from zero to maximum, is smoothly varied in correspondence with the inflexions of the voice, which, so to speak, here replaces the sending key. If, however, one started out with the intention of using an ordinary station for the purpose, two new essential conditions would immediately present themselves.

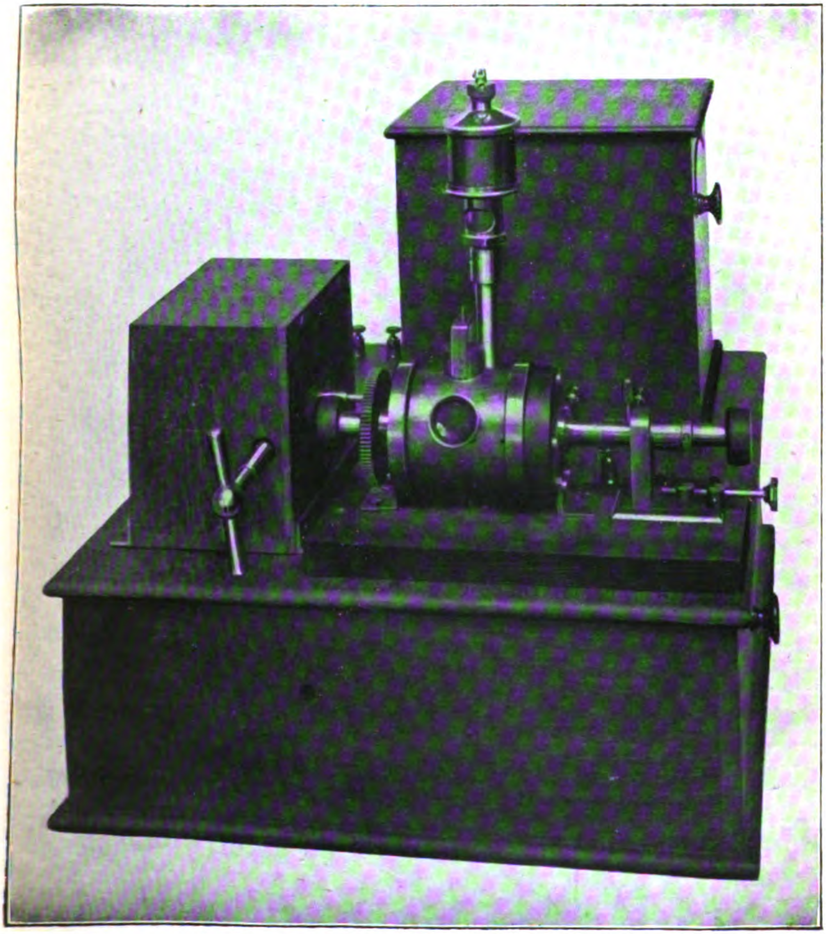
The first of these would be that the supply of wave-energy to be varied must be continuous, and not intermittent; and the second would be the presence of some means of varying it, or, in other words, of an effective microphone. It is round these two factors that all the problems of wireless telephony, as distinct from telegraphy, range themselves, and we will consider them in this order.

In an ordinary spark station—which is, of course, designed for a different purpose—each spark produces a train of oscillations; and these sparks, and hence trains, succeed each other at a moderate musical frequency of only some hundreds per second, whereas the human voice contains tones and overtones of a higher order, which would be completely killed by interruption at the lower frequency; and hence almost all experimenters have turned,

and rightly turned, for telephony to those transmitters which produce "undamped" or continuous oscillations. It is obvious that any frequency of the order which is generally called oscillatory—say, from half-a-million up to several millions a second—will be far beyond the limits of speech-frequency, and speech will treat it, and vary it, as if it were continuous. On the other hand, it must never be forgotten that it is not essential for the oscillations to be strictly undamped or continuous, provided that the train frequency is beyond the audible limit. Even this can be exaggerated, for it is quite possible to hear a high note, which is itself higher than any of the harmonics of the human voice; and if a telephone circuit be interrupted by a toothed-wheel contact, it will be found that speech is surprisingly little distortioned even while the wheel can be heard as a shrill scream. It is rather to get rid of this shrill scream than of distortion that ultra-audible frequency is necessary.

There is, therefore, nothing essentially impracticable in telephoning by means of spark-produced or damped wave-trains, provided they succeed each other with sufficient rapidity. On the other hand, it is generally as easy, and probably better, while one is about it, to produce continuous waves, and the history of wireless telephony is more or less bound up with these.

It was the invention of the arc method of producing them, especially as improved by Poulsen, which mainly brought forward the subject of telephony, though much interesting work was done by Fessenden and others with high frequency alternators; and now that not only these, but the Goldschmidt alternators and Marconi impulsed circuit generators, are available, it is probable that telephony will rapidly make further advances. It would take too much space here to enter into a discussion of continuous wave generators generally; but it may be noted that while this part of the problem seems solved for comparatively large powers, and some beautiful and singularly perfect results have quite recently been obtained by H. J. Round on a very small scale, it is for the medium-sized station that a really handy and practical generator seems yet to seek.



Wireless Telephone Transmitter.

And this brings us most appropriately to the second essential which we were to consider—the microphone—for the whole problem of the microphone is one of power.

The current going through the microphone in ordinary telephony is quite small, and as long as the power to be dealt with is small, it is easily possible to obtain one capable of dealing with the amount of energy while giving good articulation. But when a power measured in kilowatts has to be dealt with it is another matter. By using many microphones in parallel, by cooling the carbon granules with gas, or immersing them in oil, and a host of similar devices, inventors have sought to produce one capable of dealing for protracted periods with a heavy current; but either they have not been successful in this or articulation has suffered.

This is the one point in wireless telephony upon which it is hard to lay too much stress; and merely by reading of long distance and other experiments it is quite impossible to judge of their success. It is extraordinary, in practice, to observe the very marked difference between the distance at which speech is audible and the distance to which it is truly intelligible. The faint overtones and small *nuances* upon which intelligible speech depends are, at best, all too lightly impressed on the ever-varying curve of intensity sent out; and if they are smothered up or glossed over by a coarse microphone, a distant receiving station where the signals are weak gets only the bare fundamental tones stripped of all meaning. It is very easy to be deceived in this, and when well-known words are uttered, the ear glibly supplies the missing sounds, but unknown words seem to come up to the very verge of recognition, and then exasperatingly to elude it.

WIRELESS TELEGRAPHY IN THE MERCHANT SERVICE

By G. E. Turnbull.

THIRTEEN years ago the first wireless equipment installed on an ocean liner proved conclusively that the invention of Marconi had at once found an enormous scope of utility in the world's merchant service.

In its initial stages the growth of wireless telegraphy in the mercantile marine was necessarily slow. When the first vessel was equipped there was only one coast station and no other vessel with which it could communicate, so that the immediate value of the invention was not apparent to many. Much work was to be done, many sacrifices were to be made and prejudices overcome. Slowly but surely, however, the new means of communication continued to prove its worth by service to the ship itself, convenience to passengers, and more strikingly yet by the saving of human lives, until at the commencement of 1914 no fewer than two thousand four hundred and fifty passenger and cargo vessels in the mercantile marine are equipped with installations of wireless telegraphy.

So much has been published already recounting the technical history of wireless as applied to maritime communication, and so many of the benefits it confers on shipping and the travelling public are generally known or obvious that this article, to avoid the risk of being tiresome, will be limited to an outlook on the present situation, preceded by some comments not generally known or obvious on the technical and commercial policies which have brought it to its present position in the world of shipping.

Mr. Marconi's invention as applied to ship work has been developed from the very earliest stages consistently along the lines of producing an installation which, while being perfect from the scientific standpoint, should at the same time be robust, absolutely reliable, and fool-proof to the extent that it could be placed with confidence in the hands of an operator left almost entirely to his own resources when at sea. Not one of these considerations has ever been sacrificed for symmetry in the

"ensemble" or for any particular type of finish in order that the whole installation might be more attractive to a casual observer. At the same time that attention has been paid to the design and finish which apparatus of this class and value merits. One result of the policy in this respect may be that if a standard ship installation of the present day were to be set side by side with a new type the designers of which have not had experience of all the details of ship work from the outset, the new type might be voted to be perhaps more compact, perhaps more elegant in construction, or perhaps to have a finish more pleasing to the eye. However, be that as it may, such comparisons may safely be left to the judgment of impartial experts, who would attach paramount importance to considerations of actual working in all its phases, particularly as in times of extreme urgency—the most reliable test—never have the operators or the instruments in their care been found lacking.

Now that the world is at last beginning to recognise the great measure of honour and glory due to the name of Marconi for the inventor's magnificent achievements in science and engineering, it will not be amiss to say a few words upon another side of the development of wireless communication between ships at sea and between ship and shore, another side, not in itself so wonder-striking to the travelling public, it is true, as is the fact that communication over such enormous distances can be effected without visible means, but all the same of vital importance to the continued use, without hitch, of Marconi's invention, as a common factor in our daily lives, increasing our personal comforts as well as our business facilities, and providing a constant means of livelihood for thousands of employees of all grades. The origin of the organisation which has been built up side by side with the technical development of wireless on board ship may be traced back to the basic business axiom, laid down by Marconi and his collaborators from the outset, that it was not right to sell their installations, drawing immediate profits, and then leave their clients to work out their own salvation. They realised at once that it would avail a shipowner little to be possessed of a plant unless all shipowners in working their apparatus followed identical methods and regulations. Difficulties might not present themselves as between vessels of the same owner, but what of communications between vessels of rival lines or of different nationalities? The possibilities for good and bad could not be viewed in parallel with any existing

means of internal or international communication. Between telegraph offices, inland or international, the offices and lines are fixed; they remain in constant communication; the strength of signals does not vary from zero to maximum, then once more to zero, as ships come in and go out of range of each other. On board ship there are no telegraph superintendents to whom reference on telegraph matters can be made by subordinates in difficulties. The question of language as between ships of different nationalities is of a much more complex nature than it is on international lines. Where an operator on the European Continent may talk to operators in neighbouring countries of three nationalities, one wireless operator at sea may communicate during his voyage with operators of as many as twelve nationalities besides his own.

Added to the language difficulty, there was that presented by the different manner of doing things in different countries, different senses of responsibility, of initiative, and different ideas of discipline. All these obstacles would have been either almost insurmountable or would have considerably retarded progress if apparatus were disposed of finally by the manufacturer to each and every shipowner, the latter being left to reap the best benefit he could.

Clearly there was to be an international creation, not only to supply the shipowners with apparatus of recognised efficiency and uniform standard, but also to supply them with operators corresponding to the nationality of the ship, trained on uniform lines, possessing the same *esprit de corps,* subject to the same rules and regulations, and, however numerous their nationalities, all having a fair knowledge of one common tongue. In this direction, and in this direction only, was it felt that wireless could be applied successfully at sea. For thirteen years now the work has proceeded on these lines. Operators from all sea-faring nations have been engaged on identical service conditions, learnt their business at schools working on the same lines, adhered to the same general orders, applied the same rates, and learnt the language of the sea, which is English, with the result that officials and operators all the world over have worked and are still working for one common cause. Whether the ship in correspondence belonged to a rival and competing line, or carried the flag of a foreign, and perhaps not too friendly country, the wireless communications were effected just as if each ship belonged to the

same owners, and had each on board a director watching the owners' interests. When in congested regions the smallest steamer was given its chance to dispose of its traffic, it could not be overruled by the biggest and fastest liner, as the general orders had carefully provided for all without favour.

A good deal has happened since the conception and subsequent realisation of this international wireless concern. The rapidly increasing use of wireless on board ship rendered desirable the formation of national corporations in all the principal countries, with inspection and repair depôts in the principal ports. All the traffic returns of ship stations are forwarded regularly to the head office of the corporation operating in the country on which the ship is dependent, and these constitute themselves clearing houses for the telegraph traffic exchanged.

In face of all this progress, the fear of monopolies, to which all civilised States are subject nowadays, led to the assembly in Berlin in 1905 of the first International Radiotelegraphic Convention, with the object of bringing maritime wireless communications under the direct control of the respective Powers. This convention was not very productive, but the second, which met again in Berlin in 1906, and which came into force in 1908, while bringing the whole organisation under the control of the Powers, enacted Rules and Regulations so consistent with the original Marconi General Orders that one could almost say they were based upon them. The development policy as initiated and conducted has thus been endorsed by the competent authorities of all the principal countries.

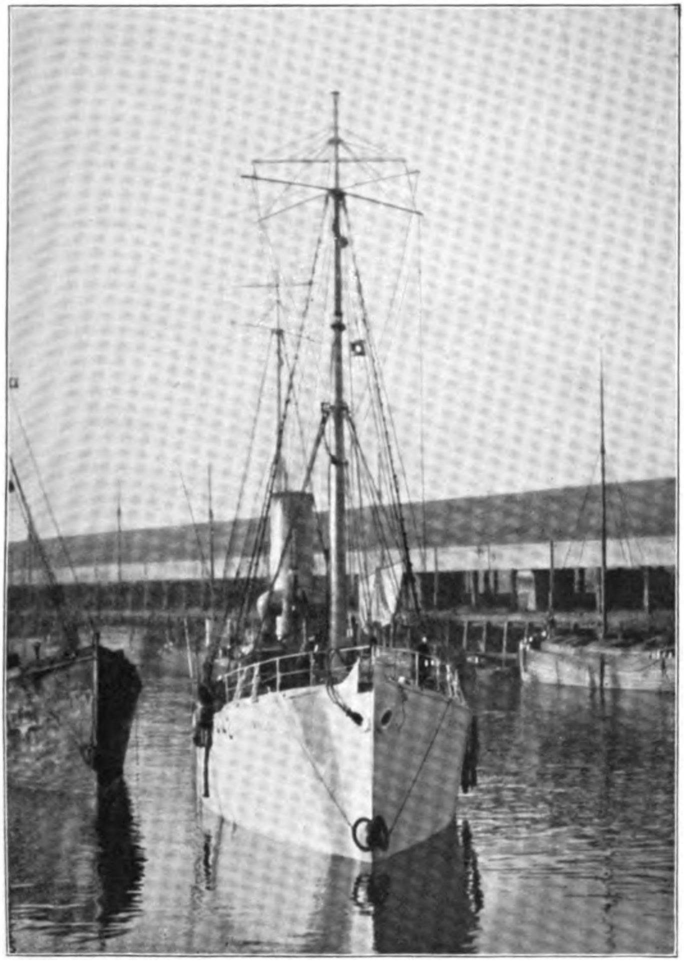
The national corporations referred to above work uniformly together, each remaining in close contact with its respective Government, with every freedom of interchange of opinions, so that the national Authorities have the necessary control while an international organisation carries out under them the work which, if done by the respective Governments or by every shipowner, would entail an enormous increase in offices and staff over those obtaining at present. For this additional expense the shipowners and the public would have to pay, and more roundabout and less efficient methods of carrying out the work would ensue.

Together with the rapid rise in the number of vessels equipped with wireless telegraphy during recent years, extensions to the administrative and technical sections of the service have been effected in several ways. The third International Radiotelegraphic

Convention signed at London in July, 1912, amplified considerably the Berlin Convention of 1906. There were many interesting features of the former convention, but it will be sufficient to refer to only one of these here, namely, that which deals with the hours of service at ship stations, as it is coupled with the provisions of the International Conference on Safety of Life at Sea signed at London on January 20th, 1914, which, in regard to compulsory equipment, decides the minimum spread during the coming three years of the use of wireless telegraphy on board ship. For the purpose of defining the hours of service, the Radiotelegraphic Convention of 1912 divided ship stations into three classes. It did not, however, specify in which of these classes ships should be entered according to the nature of the services performed by them. This has now been clearly defined by the afore-mentioned International Conference on Safety of Life at Sea (Chapter 5—Radiotelegraphy—Article 33). Under the latter convention all vessels intended to carry 25 or more passengers, and having an average speed of 15 knots or more, or if they have an average speed of more than 13 knots and carry 200 persons, including passengers and crew, and travel over distances between any two consecutive ports of more than 400 sea miles, are placed in the first class, and are required to maintain a continuous radiotelegraphic service.

All vessels intended to carry 25 or more passengers, but otherwise not coming within the above definition of first-class ships, are placed in the second class, and must maintain a continuous watch during navigation for at least seven hours a day, and a watch of ten minutes at the beginning of every other hour, and, further, must maintain a continuous watch for the whole of the time during which they are 500 sea miles from the nearest coast.

All vessels which must be fitted with wireless telegraphy as having on board 50 or more persons in all, but which do not come within the definition of the first and second classes as specified above, are placed in the third class. For these ships there are no fixed periods of radiotelegraphic service except when they are engaged in the Transatlantic trade, or in other trades if their route takes them more than 1,000 sea miles from the nearest coast; in either case they must maintain a continuous watch. Continuous watch may be kept by an operator holding the official certificate of proficiency, together if necessary with one or more "certified watchers." By a "certified watcher" is meant any



The " Columbia "—a trawler fitted with wireless apparatus.

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person holding an official certificate proving that he is capable of receiving and understanding the signals of distress.

A delay of not exceeding one year, dating from the signature (January 20th, 1914) of the Safety of Life at Sea Convention, is allowed for the training of operators and for the installation of apparatus on ships placed in the first and second classes, whilst a delay not exceeding two years is allowed from the date of ratification of the convention for the provision and training of the operators and watchers on ships of the third class, for the installation of the apparatus on ships in the third class, and for the establishment of a continuous watch on ships placed in the second and third classes.

Official figures are not yet available to indicate the total number of existing ships which within the delay prescribed by the Safety of Life at Sea Convention must be equipped with wireless telegraphy, and moreover, as the Powers signatory to the convention have the right to classify or exempt from equipment vessels according to certain minor considerations, the total number of installations, and the number of operators and certified watchers cannot be given with much degree of exactitude until the various Powers have had the necessary time to complete their organisation for the purpose of carrying out the Convention. However, in view of the limited delays allowed for the provision of installations, operators and watchers, official figures are expected to be available during the first quarter of 1914. Considering that at the commencement of 1914 out of the total number of vessels in the mercantile marines of the world two thousand four hundred and fifty units are equipped with wireless telegraphy, operated by some four thousand qualified telegraphists, the increase in these figures during the coming three years will be enormous.

The Safety of Life at Sea Convention having, as has just been shown, fully realised the indispensability of wireless telegraphy to all vessels in excess of a certain description, and provided that they shall be so equipped and maintain a radiotelegraphic service, continuous or otherwise, according to their class, has further made careful provision for the transmission by radiotelegraphy of information relating to ice, derelicts, and weather, even to the extent of providing as many as eleven separate codes for use in the compilation of the telegrams conveying this information. These codes cover the day of the month, time of observation, nature of ice or derelict observed, position of

ship, wind direction, wind force, state of the sky, height of barometer, air temperature, barometric tendency, and sea surface temperature, and a clear example for the use of each is given. The Convention has thus not only respected, but considerably extended, the arrangements which the American, British, and German navigation and meteorological authorities, availing themselves of maritime radiotelegraphy, have been making during recent years.

Perhaps the best-known signal in maritime wireless telegraphy, because it so strikes the imagination of the public mind, is the distress signal S.O.S., which has replaced the now defunct C.Q.D. signal. The S.O.S. signal may in future have to share a small portion of its claim on popular fancy with the new "safety signal" T.T.T., which has been devised by the Safety of Life at Sea Convention to precede all telegrams containing information which are of an urgent character and involve the safety of navigation, such as that concerning icebergs, derelicts, cyclones, typhoons, and sudden changes in the position or form of fixed obstructions or of landmarks.

As extensions to the technical sections of wireless telegraphy as applied to shipping recently may be cited the equipment of five North Sea trawlers. Four of these, each of them having an average gross tonnage of 215 tons, are fitted with a complete installation such as is usually installed on cargo vessels, having a guaranteed normal range of 100 miles. The fifth vessel, with a gross tonnage of 266 tons, is used as a station boat, and is equipped with a more powerful installation, with a minimum normal range of 200 miles. Having regard to the fact that the trawlers operate at distances from the coast in excess of their range, the station boat idea was adopted for purposes of retransmission. The Safety of Life at Sea Convention, in making reference to fishing boats, exempts them from being required to maintain a continuous watch.

There were many difficulties in the way of applying wireless successfully to trawlers at the commencement. Questions of space, cabin site, mast height, and accommodation for the operator had to be considered. Each of these difficulties has been successfully overcome, and in the course of the few months during which the vessels have been equipped it has been proved beyond doubt that wireless has not only come to stay in the fishing fleet, but before long will make rapid extensions there.

Other features of interest are the certain, though somewhat slow, development of the Direction Finder, or, as it has been termed, the Wireless Compass, and in addition the equipment of motor lifeboats, with small portable sets, having a range of some 25 miles.

A description of the wireless direction finder appeared in the WIRELESS YEAR BOOK of 1913. The details of its construction have been perfected, and a most successful demonstration of its utility, extending over some months, has been carried out on the steamer *Eskimo,* sailing between Hull and Scandinavian ports. Now that a special and self-contained equipment has been devised whereby lighthouses or dangerous coasts may be equipped with a simple, cheap, and automatic apparatus for the purpose of transmitting danger signals, the direction finder is likely to be adopted extensively for use in determining the position of the ship with regard to such lighthouse or dangerous position. Up to the present, and in the absence of this automatic transmitter, a vessel equipped with the direction finder has had to rely solely upon the position of other ships and coast stations to determine its own.

In regard to lifeboat sets, three of the newest liners carrying motor lifeboats include these sets in their equipment. The idea is new, and the method of application will be perfected by experience. The possibilities of such a set will appeal at once to those who will imagine the thoughts of anyone left in an open boat at sea knowing that liners were passing continually just beyond his line of vision and being unable to attract their attention.

Before concluding, a few remarks may be passed upon two other subjects of importance to the traveller—one the rates applicable to radiotelegrams, since they aflect his pocket; and the other the ocean newspaper, since it is the means of providing him with constant news of the world's happenings.

The rates applicable to radiotelegrams are divided under three heads—the ship tax, the coast tax, and the forwarding tax over the land lines or cables from the coast station to destination. The first of these is fixed by the international radiotelegraph convention at 4d. per word, with an optional minimum (applied only by certain countries) of 3s. 4d. per telegram. A reduction of this tax to 1½d. per word has been made by some of the Powers for vessels effecting regular voyages from the home port of over 200 but not exceeding 1,000 miles, whilst a further reduction has been made to ½d. per word for vessels of the cross-

Channel steamer class the voyages of which from the home port do not exceed 200 miles. The coast station charge has been correspondingly reduced, so that whilst the rate on a message from a Transatlantic liner to the British coast with destination in the United Kingdom is 10½d. per word, that on a message similarly directed from a vessel trading between the British coast and the Baltic is 5d. per word, and that on a message similarly directed from a cross-Channel steamer is 2½d. per word. The maximum coast tax specified by the International Radiotelegraphic Convention is 6d. per word, but stations in outlandish places operated at great expense are authorised to apply a higher charge. As time goes on, and as the number of ship stations increases, it is most probable that the proprietors of the ship and coast stations will be able to decrease the rates in the same way that postal, telegraph, and cable authorities have been able to do in the past.

The conduct of ocean telegraphy in the hands of one organisation has rendered possible the development of a newspaper enterprise on board ship on efficient and economical lines. On numerous passenger steamers now a daily paper is published containing 400 to 500 words of the latest news, received from powerful transmitting stations on each side of the Atlantic. A service of this kind can be run much more cheaply for a large number of vessels than for a few. One can hardly imagine a shipping company requiring a totally independent news service compiled for their vessels alone, as the cost of this special service for a limited number of ships would be considerable. By reason of the different nationalities and differing characters of the passengers carried, the only satisfactory and economical solution is to send out from any one of the powerful news transmitting stations the same varied bulletin of international character to each and every ship. The international ocean newspaper is adapted to the requirements in form, shape, and distribution of each respective shipping company. There are no fewer than seven such papers now published at sea, entitled as follows:—

"The Wireless Mail,"
"The Atlantic Daily News,"
"The Ocean Times,"
"Das Atlantische Tageblatt,"
"Journal de l'Atlantique,"
"Diario del Atlantico,"
"Giornale dell Atlantico."

It is with the knowledge that space is restricted that other minor points of interest coming within the scope of the title of this article have not been touched upon, although each of them is indirectly connected with the various matters mentioned above. At the rate at which wireless generally is progressing, one of them may develop from the minor stage into a position of highest importance. This is a subject which will from year to year afford instructive matter either for a volume of details or for a short review. It is commonplace to prophesy, but it is safe to say that "WIRELESS TELEGRAPHY IN THE MERCHANT SERVICE" will afford abundant fresh and instructive material for the YEAR BOOK of 1915.

WIRELESS AND LIFE SAVING

IT is impossible to estimate the number of lives which have escaped from the perils of shipwreck owing to the boon conferred upon humanity by the organisation of wireless telegraphy. In the Atlantic alone nearly 3,000 people have been saved by timely assistance brought to them by means of "wireless," and in other seas there are many captains who have cause to bless the day when their ships were equipped with this life-saving apparatus, and who will share to the full the feeling of gratitude expressed by the gallant commander of the *Volturno*. The public imagination is stirred only by sensational tragedies, when ships actually doomed have sent out despairing messages by this means. But not a month passes without some vessel being warned of imminent peril by wireless. The highways of the sea are strewn with derelicts, and the western portion of the North Atlantic is a great danger zone from this cause; but in one year 131 messages were sent from coast stations to passing ships warning them of these floating perils, and vessels proceeding on the North and South Atlantic routes report to each other when any derelict is sighted. No charge is made to anyone in connection with the ship-to-ship reports, which are treated by the Marconi Company as masters' service messages.

Even in the first days of the Marconi system, when it was ridiculed by sceptics, there were striking proofs of its value as a life-saving invention. The lighthouse-keeper of the Lizard, for instance, received a message from a fog-bound ship out at sea, stating that the captain believed himself to be in the neighbourhood of the Lizard, and asking that if the message were "received" the powerful fog-horns might be blown. This was done, and shortly afterwards a big German liner which had been making straight for the rocks altered her course and proceeded up the Channel. The captain, on arrival at Southampton, acknowledged the response to his "wireless" by a letter to the lighthouse-keeper. He explained that he had been running in a fog for nearly two days, and that his wireless installation had

saved him from disaster. Since that early experience of the Marconi system there have been thousands of similar instances, unheard of by the great public, but familiar in the conversation of seamen.

The following are only a few instances, but they will help to bring home the achievements of Wireless Telegraphy as a Life-Saving Agent:—

In 1909 the *Slavonia* stranded off the Azores, and in response to wireless appeal for help 410 lives were saved.

January 23rd, 1909. The *Republic* was wrecked in collision with the *Florida* in a fog. The *Baltic* in response to wireless calls rescued 761 lives.

December 13th, 1911. The *Delhi* was wrecked off Cape Spartel, with the Princess Royal, the late Duke of Fife, and their daughters on board. Wireless signals brought help from warships, and 89 passengers and the whole of the crew were rescued.

April 15th, 1912. The *Titanic* was wrecked in collision with an iceberg in mid-Atlantic; 703 were rescued in response to wireless calls sent before the ship sank.

January 16th, 1913. The *Veronese* was wrecked on the rocks at Leixoes, Portugal. Boats being useless in the storm, wireless signals brought aid, and 204 lives were saved.

January 30th, 1913. The *Mexico*, a cargo vessel, went on a voyage from New York to Dunkirk, and became unmanageable in an easterly gale. In response to her wireless appeal for help the *Devonian* came to her assistance, and towed her to Halifax.

September 27th, 1913. The United States steamer *Spokane* was wrecked off Cape Lazo on the Vancouver Coast. The *Latouche* responded to the wireless appeal for help, and passengers and crew of the wrecked vessel were saved.

September 30th, 1913. The cargo steamer *Templemore* was burnt 800 miles off the coast of the United States. Wireless signals were received by the *Arcadia* 52 miles away, and 52 souls on board the burning vessel were rescued.

October 10th, 1913. The *Volturno* was burnt 989 miles west of Ireland. In response to appeals by wireless 11 vessels, from a radius of over 200 miles, hastened to the wreck and saved 521 lives.

November 13th, 1913. Fire broke out on the Spanish steamer *Balmes,* sailing from Havana to Cadiz. A wireless call for help was heard by the *Pannonia* about 200 miles away, which sailed to the relief of the burning vessel; 103 passengers and 56 officers and crew were saved.

December 29th, 1913. The *Tasman,* a passenger vessel sailing between Australia and Batavia, ran ashore in the Gulf of Papua. A Japanese steamer responded to the wireless appeal for help, and all on board were saved.

January 13th, 1914. The steamer *Cobequid* ran aground on the sunken Trinity Ledges near Yarmouth, at the entrance to the Bay of Fundy. A distress message was received at the Wireless Station at Cape Sable, whence it was distributed broadcast. Several vessels went to the help of the *Cobequid,* and all the passengers, officers and crew were saved.

The foregoing examples of the saving of both life and valuable cargo by means of wireless telegraphy is in striking contrast to the story of the loss of the *Gardenia,* which was reported early last year. The *Gardenia* was a valuable vessel of 1,800 tons burden, and was fully laden with a cargo of copper ore, of about 3,800 tons, and this, if the price of copper ore be taken at only £36, or one-half of the current price of pure copper, represents a value of over £100,000. As the *Gardenia* was making its way across the North Sea for Middlesbrough she came into collision during a fog with the London collier steamer *Cornwood.* On hearing the approach of the steamer, the captain of the *Gardenia* stood off the Missle Cross Sands, and sounded his syren, but the oncoming vessel struck the *Gardenia* on the starboard side, cutting five or six feet into the depth. Eighteen lives were lost in the disaster. Neither of the vessels were fitted with

wireless telegraphy, and all they could do was to attract the attention of any passing vessel by whistles. It is possible that had a wireless call been sent out the loss of life need not have been so heavy as it was.

Instances might be multiplied where life or property, or both, lost at sea might have been saved had the vessels which met with disaster been equipped with wireless apparatus. The following typical instance will illustrate our meaning.

The wreck of the *Kurdistan* and the loss of all hands on board, with the exception of two, within a few miles of the Scilly Islands, is still fresh in the memory. From the evidence given at the Board of Trade inquiry, it is certainly clear that had timely help been available the ship might have been saved; at any rate the entire crew would have been rescued, and the survivors would not have had to endure their long and terrible experiences in an open boat, had it been possible to summon aid by means of wireless telegraphy.

The labour upheaval which took place in England about two years ago, and in which shipping was so largely concerned, pointed to another useful purpose to which wireless telegraphy might be applied if all classes and sizes of vessels were fitted with the apparatus. No doubt there have been many cases during shipping strike troubles at large ports when considerable time and expense might have been saved by shipowners and merchants by the diverting of vessels from one port to another had it been possible to communicate with the vessels in time. This would apply more particularly to the cargo liner and the tramp steamer. Take an instance in Liverpool during the last dock strike. Owing to the labour troubles at that port there was no possibility of vessels getting discharged for some time. Those which were carrying perishable cargo might have had a chance of being discharged in some other port, so that there would certainly be a great advantage and saving of money if those vessels could have been communicated with by wireless on their approaching the Channel, and instructions given to the captains to proceed to another port. Let us also consider the case of a vessel carrying a cargo of wheat. The cargo may change hands

several times between the departure of the vessel from the United States and its arrival at the port of destination in this country. It eventually might be better for the vessel to put in, say, at Cardiff instead of at Hull, or *vice versa;* but an alteration in the course is only possible if the owners are enabled to communicate with the commander by means of wireless telegraphy.

Whether the increased security afforded to ships equipped with wireless telegraphy will have some effect upon marine insurance rates remains to be seen, but the United States Commissioner of Navigation (Mr. Chamberlain), in his Annual Report for 1911, predicted that the time was not remote when part at least of the expense of the equipment would be offset by a reduction in insurance rates. So far the marine insurance companies have not made a distinct difference in their rates on hulls and cargoes on account of wireless, but the subject has been under consideration by insurance companies and underwriters. The fact that a vessel at sea which can now communicate at will with other vessels or shore stations hundreds of miles distant is in less risk of total loss than one out of touch with the rest of the world cannot be entirely ignored by the insurance companies.

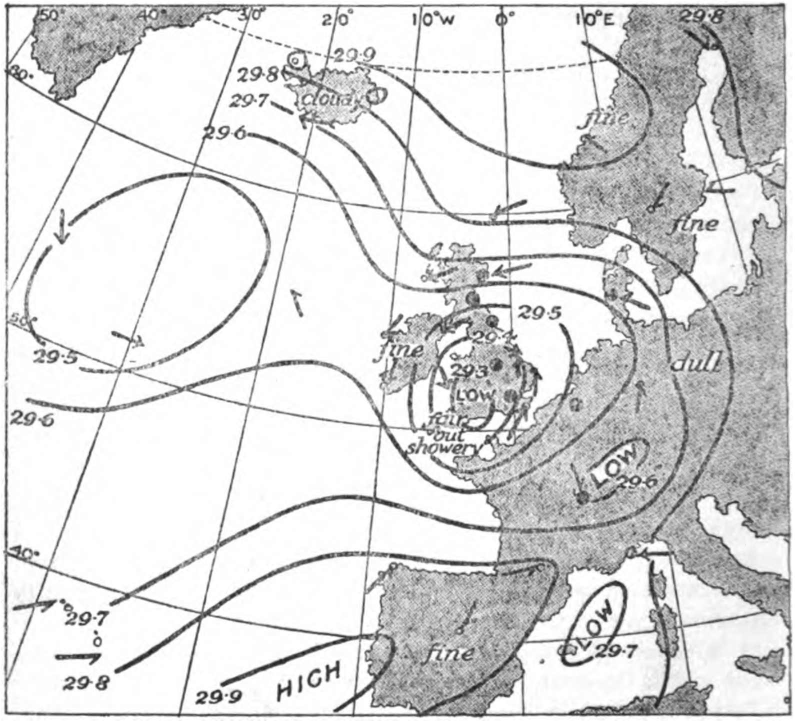
THE APPLICATION OF WIRELESS TELEGRAPHY TO METEOROLOGY

By R. G. K. Lempfert, M.A.
(Superintendent of the Forecast Division of the Meteorological Office).

THE application of wireless telegraphy to the collection and distribution of information regarding the weather has already assumed considerable dimensions, and there can be little doubt that in the future it is destined to play an even larger part therein. Weather forecasting, or the art of foretelling future weather from information as to the present weather, collected by telegraph, dates from the middle of the last century. By that time the phenomenon of the "travel" of weather, which we shall have occasion to examine more closely presently, had become familiar, and the development of the electric telegraph made it possible to apply it practically to such problems as the issue of warnings of gales. Public attention was forcibly directed to the matter by a violent gale which occurred in the Crimea in November, 1854, and did great damage to the allied French and British fleets. The French astronomer, Le Verrier, was able to trace the progress of this storm across southern Europe, and to demonstrate that, given means for promptly collecting and distributing information about it such as the telegraph provides, it might have been possible to warn extensive areas of the approaching danger. In this country the severe gale of October 26th, 1859, in which the *Royal Charter* was wrecked off Anglesey, with great loss of life, further stimulated public interest. The upshot was that organisations were called into being, in France in 1858, and in this country in 1861, for the collection at a central office of daily telegraphic reports of the weather. Reporting stations were established in many localities, and the information which they transmitted put the central office in possession of what may be called a bird's-eye view of the weather conditions over a large area. The system has been greatly extended since those early days, and similar offices now exist in all countries.

Let us glance briefly at the organisation as it exists to-day in our own country. Observations are made each morning at 7 a.m. of the mean time of the meridian of Greenwich, at thirty-

one stations distributed over the length and breadth of the British Isles. They are forthwith coded and telegraphed to the Meteorological Office in London. Similar observations are taken at the same hour on the continent of Europe, and an elaborate system exists for the exchange of information between the various countries. Reports reach the Meteorological Office daily from forty-two stations distributed over western Europe and the Atlantic Islands from Iceland to Madeira and the Azores. By

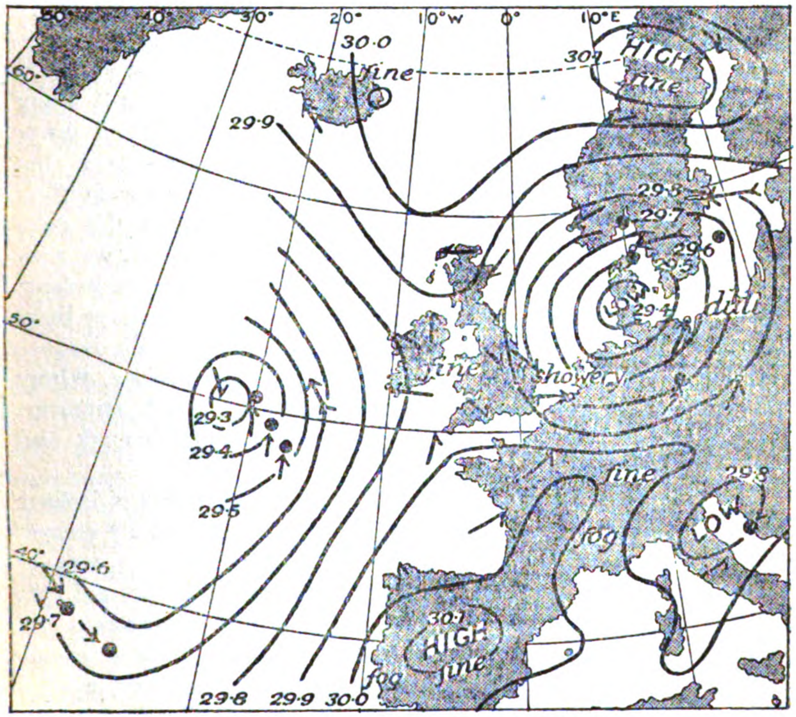


7 A.M. October 8th 1913
Fig. 1.

9 a.m. the exchange of observations ought to be complete, so that the work of drawing up reports and forecasts may be taken in hand. Similar, though less extensive, sets of observations are taken at 1 p.m. and 6 p.m., and reported to the Meteorological Office by telegraph.

The information communicated includes the reading of the barometer, the direction and strength of the wind, the temperature of the air and the state of the weather, using the word

in the more restricted sense, whether it be rainy, cloudy, cloudless, foggy, and so on. Immediately after their receipt the reports are plotted on an outline map of Europe. Specimens of these maps on a reduced scale are shown in the illustrations. The barometer readings at the individual stations have been omitted from these reduced maps. Instead lines are shown which have been drawn in such a way that the height of the barometer has a definite and constant value along any given line. These



7 A.M. October 9th 1913

Fig. 2.

isobars, as the lines of equal barometric pressure are called, give the key to the meteorological situation from the forecasting point of view. It will be seen that they arrange themselves in more or less definite shapes or systems. In the maps reproduced there are examples of systems in which the isobars are approximately concentric circles, with the lowest barometric values at the centres of the systems. On the map for October 8th such a system covers the British Isles, while on that for October 9th a similar system

is centred over Denmark. The map for October 9th shows examples of other systems, in which the isobars again form closed curves, but with the highest barometer at the centre of the system. Systems of this kind are shown over Spain and the north of Scandinavia. The name "cyclone" is applied to systems in which the lowest barometer occurs at the centre, while a system having the highest readings at the centre is called an "anti-cyclone."

A very close relation is found to exist between the isobars and the direction and force of the wind, indicated on our maps by arrows. A cursory acquaintance with weather maps will confirm the statement that the general direction of the wind is along the isobars, though slightly deflected towards the side of lower barometer. In the northern hemisphere the direction is such that the region of low barometer is on the left of an observer standing with his back to the wind; in the southern hemisphere this relation is reversed. As regards the strength of the wind, we may generalise and say that the less the distance between the isobars the stronger the wind. In the map for October 9th there are light airs over France, Spain and the British Isles, where the isobars are far apart, but in the region covered by the cyclone, where the isobars are more crowded, the winds are much stronger. Winds of gale force are shown over the north of Denmark and south of Sweden.

The distribution of weather with regard to systems of isobars is also subject to law, though the relation is not so easily defined as in the case of wind. Note in the diagrams the regions of rain, indicated by conspicuous black dots, to the north and east of the centres of the cyclones, and the regions of showers and clearing sky south-westward of the centres. Note also in the anticyclones over Spain and Scandinavia the fine weather, marred locally by fog. These distributions are typical. Space does not allow of a detailed description of what is known of the relation of "weather" to isobars. Suffice it to say that if it be possible to anticipate the distribution of the isobars twelve or twenty-four hours ahead, we can also anticipate with great accuracy the direction and force of the winds, and form a tolerably good estimate of the distribution of rainfall and other types of weather.

What is to guide a forecaster in constructing the mental picture of the future isobars on which his forecast must be based? The first place must undoubtedly be given to the principle of "travel" to which reference has already been made. Our maps

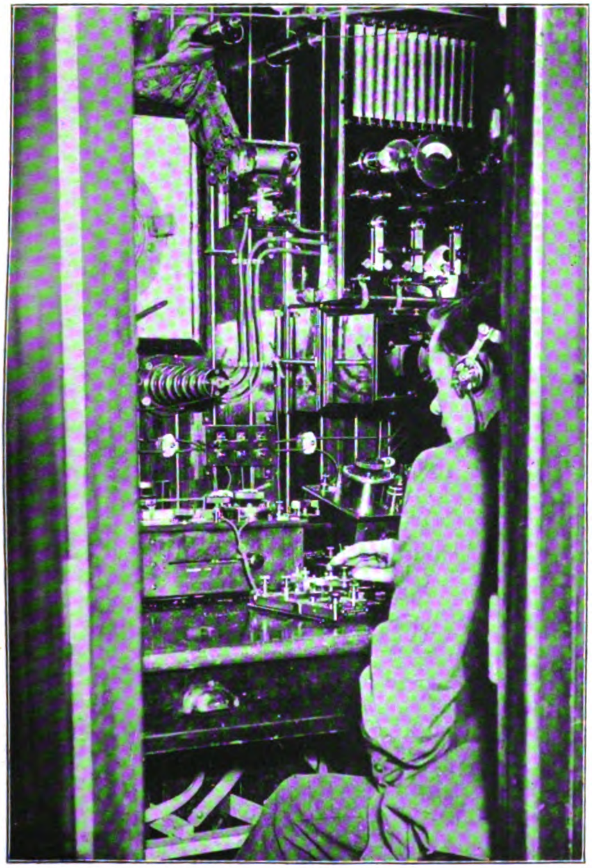
illustrate this point. The cyclone shown over the British Isles on the morning of October 8th travelled north-eastward, and on the morning of the following day its centre lay over Denmark. The distribution of wind and weather around the centre of the system is roughly the same in the two maps, and we may infer that a place over which the system has passed has experienced the sequence of changes of wind and weather depicted on the maps in the parts of the cyclone which have passed by. In such a case it is easy to see the general lines on which a successful forecast could be framed. It would be rash to conclude that "travel" is the only factor which has to be taken into account. The possibility of the development of new systems, or the disintegration of existing ones, or changes in what we may call their intensity, have also to be reckoned with, and unexpected development naturally leads to forecast failure. Even the principle of travel may be incorrectly applied, for the direction and rate of progress of meteorological systems show great variety and cannot always be successfully estimated from the examination of a weather map and comparison with its predecessors. It is not the object of this article to discuss such points in detail, for further information on the subject reference must be made to one of the many text books of meteorology.

Without going into details it may, however, be stated that the most usual direction of travel of meteorological systems in temperate latitudes is from west to east, or, rather, from some westerly to some easterly point; and from this it will be apparent that a knowledge of the weather conditions over the Atlantic Ocean must be of great importance in the problem of forecasting the weather of Western Europe. Attempts have been made to utilise weather reports transmitted by cable from America, but the developments which weather systems undergo in transit over so vast an area as the Atlantic Ocean have proved a barrier to effective use of such reports for forecasting purposes. When the cables to Iceland and the Azores were laid the meteorological services were not slow to take advantage of them for securing reports from those places, but even then there remained an important area immediately to the westward of our own coasts outside the ken of the forecaster. By the time that even the fastest liners brought in their reports the weather situation had changed too much for them to be useful for forecasting.

Wireless telegraphy has now rendered it possible to transmit much of this valuable information in time for its immediate

application. The honour of the first systematic attempt in this direction belongs to the *Daily Telegraph* newspaper, which in the year 1906 made arrangements for collecting and publishing weather reports from Atlantic liners. In 1907 arrangements were authorised by the Admiralty for the occasional dispatch of wireless reports to the Meteorological Office by ships of H.M. Navy. Early in 1909 the British and German Meteorological Offices arranged with the Marconi Company for a three months' experiment for the organised collection of wireless reports from liners. The Shipping Companies and their officers co-operated cordially is this scheme, which proved to be the commencement of the present extensive system for the collection of observations from British ships.

Practically all British liners engaged in the North Atlantic trade co-operate in this scheme. Observations are taken at the same hours as at the land stations, viz., 7 a.m. and 6 p.m. Greenwich time, and while ships are east of 20° West, also at 1 p.m. The information coded in the reports comprises the date and hour of the observation, the position of the ship, indicated by quoting the number of the one degree square in which it is situated at the time, the reading of the barometer, the direction and force of the wind, and the "weather." Observations of temperature would also be most desirable, but there is no space for them in the code as at present arranged. The observations are supplemented by control observations, giving the same particulars as observed three hours earlier. These control observations are useful in enabling the forecaster at the Meteorological Office to detect errors which may have crept in in taking the observations, in coding them, or in course of transmission. For example, if the positions of the ship at the time of the control observation and at the time of dispatch of the message are inconsistent with one another, an error is obvious and reference to the sailing chart issued by the Marconi Company or to previous reports received from the same ship will often serve to elucidate the mistake and so prevent wrong deductions being made from the observations. Similarly, if the two barometer readings show an unreasonably large difference, an error may be assumed and allowance can be made for it. But the utility of the control observation is not limited solely to the detection of errors. The rate at which the barometer is rising or falling is a most important consideration in forecasting, and a comparison of the two barometer readings gives valuable information on this point.



The Operating Cabin on board a trawler.

[To face page 544

Important inferences may also be drawn from a change of wind occurring between the control observation and the dispatch of the message. The matter is complicated at sea by the fact that the ship is itself moving, but allowance can be made for that in interpreting the results.

A glance at the maps (pp. 540, 541) will show the application of wireless observations to forecasting. The second map, for October 9th, shows the presence of a cyclone with the centre approximately in latitude 49° North and longitude 21° West. Without wireless reports the forecaster would have suspected the existence of a disturbance off the west coast of Ireland from the fact that the wind at the Irish stations had shifted from north, the direction appropriate to the rear of the cyclone centred over Denmark, to south or south-east, but as the barometer over Ireland was not falling he would have had no direct evidence to confirm his suspicion. Actually only the most easterly of the five ships' observations shown on the chart reached the Meteorological Office on the morning of the 9th, but even this one report materially extended the knowledge of the forecaster. It showed a strong south-easterly wind and a barometer reading of 29·54 inches in longitude 16° West. The reading at Valencia, in the south-west of Ireland, was 29·75 inches. The draughtsman would therefore have to draw two isobars, those for 29·70 and 29·60 inches in his pictorial representation of the barometer readings to the westward of Ireland. From this the forecaster would assume that the new system was one of moderate intensity and his experience of past maps would lead him to expect that it would follow approximately the same path as its predecessor. A forecast for the eastern districts of England of wind shifting from north-west to south or south-east was thus tolerably safe, and when the Irish observations later in the day indicated a fall of the barometer little hesitation was felt in issuing telegraphic instructions to the storm-warning stations in Ireland to "hoist south cone." The map for the following morning, October 10th, showed that the eastern margin of the new cyclone had advanced to the North Sea, and storm warnings to the South of Ireland, if delayed till then, would have been too late. It will be seen that the usefulness for forecasting of such observations depends on their receipt at the Meteorological Office within an hour or so of the taking of the observations. Under present circumstances many reports that might be most useful occupy so much time in transmission from ship to ship that the time for their application

to the forecast for the day has gone by when they reach the office. It is gratifying to be able to note a considerable change for the better in this respect during the past few months and further improvement may be confidently expected as the range over which ships can signal increases.

A word may not be out of place with regard to the accuracy required in barometer readings which are to be used in the preparation of maps for forecasting. An officer at sea wishing to use the indications of his barometer to assist him in anticipating the nature of the weather he is likely to encounter, naturally pays most attenton to the changes which his instrument shows. It is a matter of comparatively little interest to him whether it be correctly set. It may read 29·5 or 29·3 inches without materially affecting his deductions. He requires primarily to know the rate at which it may be rising or falling. To the forecaster the difference between 29·5 and 29·3 inches is vital. If, for example, the reading on October 9th, to which reference has already been made, had been received as 29·34, instead of as 29·54, four isobars instead of two would have had to be drawn between Valencia and the position of the ship. The forecaster, if he had accepted the report as correct, would have drawn the conclusion that the oncoming cyclone was one of great violence and would have issued storm warnings with quite needless profusion.* Mercury barometers which have been compared with the standard instrument at a central institution, such as the National Physical Laboratory are the most trustworthy, but their readings must be corrected for temperature before they can be entered on a weather chart, and so great is the height of the modern liner that a correction must also be applied to reduce the reading to sea level. Aneroid barometers are more convenient to read, but they almost always require a correction to reduce their readings to "standard," and the correction may vary from time to time. It is therefore necessary to check the correction at frequent intervals, which may be done with considerable accuracy by taking

* A case of this kind occurred in January, 1914, while this article was in the press. Two ships reported strong south-east winds and a low barometer in longitude 15° W., and as the reports confirmed one another they were accepted as correct, and instructions to hoist storm cones were issued to the South of Ireland and South-West of England. Soon after a report was received from a third vessel which threw doubt on the first two observations, but as it was possible that the error was in the later report, the instructions to hoist cones were not cancelled. At the following hour of observation the ships reported themselves in close proximity to the Irish coast, and it was then obvious that the first two barometer readings required corrections of about 0·2 inch.

readings when in port at 7 a.m. and 6 p.m. and seeing whether they are concordant with the weather maps published in the Daily Weather Report of the Meteorological Office.

Errors in the position of the ship or the date and hour of the observation may prove equally misleading. A source of uncertainty which does not affect reports from land stations is introduced into ships' reports by the elements of time and place. For a land station the place name identifies the position with certainty, and as the messages are generally received within an hour or so of their dispatch the time on the telegram serves to identify the time of the observation, though occasionally confusion arises on this score after an interruption of communication. The name of a ship does not identify her position, and as messages are occasionally several days in transit, the time on the telegram, which is the time of receipt at the shore station, affords no clue to the time of the observations. These particulars have, therefore, to be given in code in the text of the message.

Hitherto we have considered only the application of wireless telegraphy to the collection of information from ships at sea with a view to its application to forecasting, but wireless telegraphy also plays an important part in the distribution of information regarding present and future weather. This aspect of the subject engaged the attention of the International Conference which met in Paris in September, 1912, to discuss the question of wireless time signals and kindred matters. Each morning and afternoon a weather report is signalled from the Eiffel Tower immediately after the time signals. It includes a selection of the reports collected by the Meteorological Department of France from Newfoundland, Iceland, Europe, and the Azores, and gives information for the construction of a weather map of the European area with sufficient detail for the identification of the main weather systems. The report is intended primarily for the information of ships at sea, but institutions on land which are interested in meteorology have not been slow to realise the advantages it offers.

Ships at sea have further the opportunity if they wish of supplementing the report from the Eiffel Tower by means of reports exchanged with other ships. On most days it would be possible to construct at sea a weather map of the North Atlantic and Western Europe from data contained in the Eiffel Tower message and in the reports in course of transmission to the Meteorological Office.

In addition to the reports from the Eiffel Tower, reports and

forecasts having reference principally to the weather of the North Sea and the Baltic are prepared each day by the German Meteorological Department for issue from the wireless station at Norddeich. In this country the Meteorological Office prepares forecast messages intended primarily for the use of H.M. ships in home waters, which are signalled twice a day from the Admiralty station at Cleethorpes.

In the present state of meteorological knowledge forecasts must be limited to comparatively short periods. As a general rule the forecasts issued by the Meteorological Office refer to the twenty-four hours commencing with the noon or midnight next following their issue. It is only on comparatively rare occasions that the conditions are sufficiently definite to justify the addition of a "further outlook" extending the period covered to two or more days. It follows that the utility of a forecast system must depend greatly on satisfactory means for the rapid collection at the central office of the observations on which the forecasts are based, and for the prompt distribution of the forecasts to those who may wish to use them as guides in deciding their course of action. Though the cable and the telegraph line may remain the principal means for collecting the reports from individual stations at the central offices, wireless may play an important part in the future in the distribution of forecasts. At present the distribution is mainly by means of the newspaper press, and it is unavoidable that a considerable part of the twenty-four hours to which they refer should have elapsed before the forecasts are actually in the hands of the public. Widespread distribution by ordinary telegraphy has proved too expensive and distribution from a centrally situated wireless station of sufficient power supplemented by the telephone may ultimately prove a satisfactory solution of the present difficulties standing in the way of effective circulation. The number of private receiving stations is already large, and it is likely to increase. Such stations are not expensive to instal or to maintain and no great skill is required on the part of the operator to take off messages such as those sent from the Eiffel Tower.

Apart from the application of meteorology to practical affairs, the study of weather stands to gain largely from the extension of wireless communication. It is unreasonable to suppose that the weather of one region is entirely independent of the weather of other parts of the globe, and meteorologists look forward to the day when it shall be possible to discuss the meteorological relations of the world as whole. No doubt the day is distant

when it will be possible to draw a weather map for the whole globe day by day, but progress in that direction is steady though slow. It may be noted in passing that from the beginning of the current year the Weather Bureau of the United States has published on the back of its well-known Daily Weather Report a chart showing the distribution of pressure and temperature over the Northern Hemisphere. As a means of linking up outlying regions, wireless communication offers special facilities. We already know enough to make it highly probable that great importance will attach to the weather conditions of the Polar regions when the problem of making forecasts for long periods comes to be tackled, and a notable step in the direction of securing knowledge of them was made at the beginning of 1913, when the establishment of regular wireless communication with Spitzbergen, in latitude 78° North, made it possible to secure regular reports from a place within 800 miles of the North Pole. It is also to be hoped that the day is not far distant when wireless communication will be available between Greenland and Iceland, so that regular meteorological reports may be secured from another important outpost. The southern point of Greenland juts out to latitude 60° North, the same as that of Shetland and St. Petersburg, and it is so near to Labrador that it could easily supply a link of connection between the old world and the new.

The chief feature of the impression which experience leaves on the mind of a forecaster is the imperative need for accuracy in the barometric readings and the specification of the position of the ship. No words can describe the feeling of paralysis which comes over the maker of a weather map when he tries to reconcile discordant readings. When an observation arrives at the office the first question is how it fits in with the system of which the outlines are already laid down, and if there is any uncertainty about a new reading the question whether to modify the system or reject the reading becomes a perplexing enigma.

In earlier days with land observations, enigmas of this kind were not infrequent, and history repeated itself in the earlier days of "wireless," but with perseverance and the cordial co-operation of the ships' officers and Marconi operators such enigmas are gradually disappearing and we may here record the debt of gratitude which meteorologists on shore owe to their colleagues afloat in the endeavour to make the collection of information about the weather of the greatest benefit to those on land and sea.

WIRELESS TIME SIGNALS AND LONGITUDES

By Arthur R. Hinks, M.A., F.R.S.
(*Assistant Secretary of the Royal Geographical Society*).

In the Year-book for 1913 we gave some account of the service of wireless time signals established at the Eiffel Tower, by the co-operation of the Paris Observatory, the *Bureau des Longitudes,* and the Commandant of the military wireless post installed at the tower. In the present article we will deal first with the arrangement of this time service in somewhat greater detail.

The military post is established in a series of underground chambers sunk in the Champ-de-Mars to the south of the tower. It was put underground in order not to interfere with the amenities of the place, but with the unfortunate result that it was destroyed as soon as it was finished by the great flood of 1910, which delayed for the greater part of a year the establishment of the service.

Technical details of the installation have been given recently by Commandant Ferrié in a paper read before the Institution of Electrical Engineers, and we need not repeat them here. But it will be of interest to describe the method of sending out the signals.

At 10.40 in the morning and at 11.40 in the evening the operator at the tower sends the call familiar to every owner of a receiver—the general call and the wait signal; he then switches over to the line connecting the post with the Observatory. Two minutes later the sapper telegraphist on duty at the Observatory sends the "*Paris Observatoire Signaux Horaires.*" He then takes his stand at a telescope in the clock room of the Observatory, and watches the dial of the standard mean time clock. At 10.44 he begins to send the first series of warning signals by hand, and as he finishes at 10.44.55 he switches the clock into the circuit. At 10.45 the clock itself sends the first time signal, a single rather long dot. The clock is then cut out, and at 10.46 the operator begins again with the second set of warning signals, proceeding as before to switch in the clock just in time to send the 10.47 signal; and so for the third set. Immediately after the

last time signal at 10.49 the Observatory is cut off, and the operator at the tower sends out the weather report and forecast prepared by the *Bureau Central Météorologique.*

This morning and evening service of three single time signals is intended for the general use of all those who want the time with an accuracy of about two-tenths of a second—clock-makers, navigators, or field surveyors engaged on work of secondary precision. But the exactness with which these signals can be observed and compared with clocks or chronometers is not high enough for purposes of precision, and for these a special service is provided at about 11.30 each evening. The principle is that of the "*vernier acoustique.*" A clock at the Observatory, beating fifty in forty-nine seconds, is put into the circuit, and sends at each beat a very sharp signal, which in the telephone receiver is exactly like the tick of the clock to be compared with it. The comparison is made by the method of coincidences. The Paris signals gain rapidly on the clock, and the coincidence of beats can be determined to within about one beat, or a fiftieth of a second. During the space of nearly three minutes, or, more precisely, one hundred and eighty beats, that the signals last, there will be three coincidences; and the mean of the three gives a comparison which may be relied on to well within the fiftieth of a second, or well within the accuracy with which time can be determined and kept at a single observatory.

The theory of this method is simple. In practice it is not so easy to carry out, for one is very apt to lose count and become confused between the Paris clock and that which is compared with it. The series of 180 beats is broken into three by the suppression of the 60th and the 120th, which gives an opportunity for picking up the count after each coincidence. And there are various devices for counting and recording the corresponding beats and seconds which are fully explained in the second edition of the well-known pamphlet published by the *Bureau des Longitudes,* "*Réception des signaux radiotélégraphiques transmis par la tour Eiffel.*" It will be enough to make here only two remarks. First, it is advantageous that the clock to be compared shall be heard, not directly, but in the telephone receiver; and the easiest way of arranging this is to make use of the fact that it will naturally be fitted with contacts for sending seconds to the chronograph. If the wire carrying these signals passes anywhere near the wireless receiver the ticks will be heard in the telephone. It is easy then to arrange that the observer shall have a resistance

at hand to vary the strength of the clock signals and to cut them out at pleasure. The latter is essential. Until one has picked up the beats of the Paris clock the other should not be heard, or there may be confusion.

The second desideratum is a means of recording the signals automatically, instead of relying on coincidences determined by ear. At the Eiffel Tower station they have a beautiful arrangement of a photographically recording galvanometer, which catches the signals, and a mirror mounted on a tuning fork, which sends a second spot of light to the record to make a finely divided time scale. This is excellent as a laboratory method, but delicate for general use. A relay sensitive enough to record the wireless signals mechanically is wanted for this, as for all other operations of wireless.

We have still to explain how the observer is told the time of each beat of the "*vernier acoustique.*" The series goes out at 11.30 in the evening. It is received at the Paris Observatory and compared with the standard clock. A few minutes' calculation gives the precise time of the first and last beats, and these are reported, to the hundredth of a second, in a wireless message sent out from the Observatory immediately after the evening set of ordinary time signals, at about 11.50 p.m.

In our article in the last Year-book we spoke of the proposed establishment of an international time service, to be maintained by an international bureau established in Paris. It was hoped that this would be in operation by the 1st of July, 1913. But progress has been slower than was anticipated, and neither the bureau, nor the revised system of sending the signals, nor the new hours for the signals are yet in operation. But meanwhile an interesting re-determination of the difference of longitude between Paris and Washington has been in progress, which has given valuable information as to the technical difficulties of a precise world-wide time service and determination of longitudes. The essential condition of the operation is easily stated. At a certain instant the clocks at Paris and at Washington are to be compared by the receipt at one of a wireless signal sent by the other, and the errors of both clocks on local time must be known with the utmost precision at the moment of comparison. Herein lies the first of the difficulties. The time is of course determined by star observations with the meridian circles of the two observatories. But the night may not be fine at both when the signals are sent. One must then rely upon the clock to carry forward the time quite

uniformly, to bridge over the interval between the moment when star observations are possible and the moment when the signals are sent.

Secondly, if the time observations are really simultaneous, it means of necessity that different stars are observed; and any error in our knowledge of the relative places of those stars is reproduced with its full effect in the resulting difference of longitude. Or if, on the other hand, it is considered essential to get rid of this error by employing the same stars at both observatories, then the star observations are of necessity separated by an interval equal to the difference of longitude, and one must rely on a combination of the clocks to bridge the interval.

In trying to reduce the problem to its simplest terms, for the purposes of this statement, we have of course unduly simplified it. In practice the determinations of the clock error will be as continuous as possible at both stations, while the operations will extend over a long space of time, or will be repeated at intervals throughout a whole year. Little by little the errors due to the want of precision in the star places, and the other errors due to the imperfect running of the clocks, will then be averaged out and eliminated. But there will remain the more recondite sources of error derived from the residual differences of personality of the observers with the transit instruments; the small unsuspected or imperfectly determined errors of the instruments themselves; not to speak of the probability that new sources of error, hitherto unsuspected, will be found when everything else has at great pains been eliminated. It is that possibility which lends a fascination to the employment of a new and precise method.

The performances of wireless have in fact for the moment outstripped the possibilities of instrumental astronomy. It is easier to compare the time at two stations than it is to determine it at either. Despite the introduction of the Repsold micrometer, which is supposed to eliminate the personality of the observer, there remains a certain small difference between the results of the transit observations made by different observers; while it is difficult for any astronomer, however well installed his transit instrument, to be certain that neither the errors of figure of his pivots, nor the residual instability of his azimuth, nor horizontal flexure and refraction, have vitiated the determination of his time by one or two hundredths of a second. The introduction of wireless telegraphy demands a re-examination of all these questions, while at the same time it lends powerful aid in their

elucidation; for they all enter into the results of any one observatory in a semi-systematic way, and are shown up in striking fashion when it is a question of determining time and longitude in the way which is contemplated for the *Service internationale de l'heure*.

We have already remarked that there has been some delay in establishing this service. The official report of the Conference that met at Paris in October has not yet been published, and nothing is known publicly of the reasons for the delay in putting into operation at any rate the new partition of hours and the new scheme of signals. It is, however, worth while to note that the complete realisation of the scheme must necessarily be delayed for some time. The essence of the plan is that the time to be distributed from the central bureau shall be international: that is to say, it shall not depend upon the observations of a single observatory, but upon the mean of all those co-operating, taken with due regard to the weight of each contribution in respect especially of its age or the time which has elapsed since the star transits on which it is based were made. Now it is obvious that before such a co-operation can be effective in producing a highly accurate absolute determination of Greenwich time, it is essential that the relative longitudes shall be known with a high degree of precision, a precision much greater than has been achieved up to the present time.

Were the contributions of all the observatories uniform in their incidence, these errors of relative longitude would not matter very much. The mean of all the contributed times would be, not the time of the meridian of Greenwich, but of a fictitious meridian very near that of Greenwich. But since in practice the contributions of each would vary in their incidence with the varying weather at each observatory, the fictitious meridian would oscillate sympathetically, and the desired accuracy would not be achieved. In practice these roughnesses would show themselves in the residual differences between the times communicated by each observatory, and they would gradually be smoothed out by adjustments of the adopted longitudes. But at first they would be conspicuous. During the first year or two of an international co-operation such as will be established, the principal outcome would be in effect the re-determination of all the longitudes in Europe.

Since it is agreed that the basis of the longitudes shall be the meridian of Greenwich, a special responsibility rests upon that

Observatory, and it will be of great interest to see what view is taken of the adequacy of the Greenwich instrumental equipment for the duty which will be thrown upon it. The famous meridian circle built by Airy some sixty years ago is unique, in that it has, without any serious modification, been at work ever since at full pressure, and has probably achieved as much as any other dozen instruments. But this has necessarily required that Greenwich should be content with a slightly lower degree of meticulous refinement than is the rule of some other observatories, where the elaboration of method and instrument is much greater and the output of work correspondingly less. British astronomers all over the world will await with a lively interest the outcome of the new conditions, and public opinion will demand that whatever new provision of instruments or of space may be required shall be granted by the country in a spirit fully conscious of the great position which Greenwich occupies.

While the schemes for the establishment of international time, and a re-determination of longitudes already fairly well determined, must necessarily make slow progress, there has been no delay in getting to work with the utilisation of time signals by wireless in the survey of new country. In the last Year-book we wrote that "territories which are unmapped now, and which are likely to remain unmapped indefinitely under the old régime, might at relatively small cost be covered with astronomically determined positions . . . which would serve as centres of survey for the surrounding country." Every month brings news that such surveys are being conducted with great activity. French parties in the Sahara desert, Belgian parties in the Congo forests, Dr. Filippi's expedition in the Himalayas, Commander Edwards on the survey of the disputed frontier between Bolivia and Brazil, have all used wireless for the determinations of longitudes, and all agree that its introduction has revolutionised the methods of exploratory survey. The last case is of especial interest, because the survey parties were at work before wireless signals became available, and they have been able to improvise their equipment while their work was under way. The Brazilian station of Porto Velho was within easy range, and by leaving a small party there to determine the time and signal it each night they were able to carry out a whole series of longitude determinations which served all their requirements, though their receiving aerial was nothing more than a long wire hung up in the tallest trees.

Let it be understood that the old objection to the use of

astronomical positions in map-making is not in the least affected by the revolution in methods which makes the determination of these positions in both co-ordinates, longitude as well as latitude, so relatively easy. Astronomical positions will never be sufficient for precise mapping, because of the irregularities in the direction of gravity at places relatively near together. An astronomical position is the direction of the vertical at the place, referred to the polar axis of the Earth, and the plane of the prime meridian. But owing to local attractions and deviations of gravity the vertical of a place is rarely quite perpendicular to the spheroid which represents as best it can the general figure of the Earth. The consequence of this is that the difference of two places in latitude and longitude, as determined astronomically, will rarely correspond precisely with the distance between them as actually measured on the ground. Hence for precise mapping, on a large scale, the old process of triangulation will never be superseded by latitudes and wireless longitudes.

But there are immense regions of desert and forest in which triangulation is so expensive as to be impracticable, and in which very precise work is happily not required. It will be long before the forest of the Aruwimi is closely settled and wanting a precise cadastral or topographical survey on a large scale. But meanwhile it urgently wants a map of some kind, which shall be accurate enough to show no perceptible errors on the scale of one in a million—for example, the scale of the new International map of the world. This the introduction of wireless can achieve, and is in fact already achieving so quickly that it seems likely the surveys will far outrun the capacities of the cartographical establishments to produce the sheets.

INTERNATIONAL TIME AND WEATHER SIGNALS

IT has already been possible by means of wireless telegraphy to determine the differences of longitude between Paris and the following places :—Brest, Bizerta, Brussels, Algiers, Toulouse, and Nice. In the delimitation of the Franco-Liberian and Franco-German frontiers in the Congo, as well as of the Brazil-Bolivian boundaries, use is made of wireless telegraphy for the determination of the longitudes. Numerous points have been determined in the same manner in Morocco by the French Army Staff by using solely the scientific signals transmitted nightly from the Eiffel Tower. It is easy to foresee the important services which this method will ultimately render in the surveying of Central Africa and of similar parts of the globe which are difficult of access and where ordinary surveying methods cannot be used. The following information respecting time signalling and meteorological services carried out at various wireless stations should therefore be of practical as well as scientific interest and should be of benefit to mariners and to the large number of amateurs who have made arrangements to receive those signals.

INTERNATIONAL TIME SIGNALS.

EIFFEL TOWER (PARIS).

The following decisions were arrived at at the International Time Conference held in Paris in 1912 :—

The radiotelegraphic station of the Eiffel Tower transmits each day signals and telegrams of general interest, which are enumerated below :—

"Ordinary time signals" sent out twice per day—at 10 a.m. and at midnight.

"Scientific time signals" which precede the ordinary time signals by night.

Two "meteorological radiotelegrams of general order" transmitted each day, one immediately after the morning time signals, the other at 5 p.m.

"Measure signals" intended to permit observers to study the variations of intensity of the signals according to the time of year and the meteorological conditions, which are transmitted twice daily before the ordinary time signals.

"Urgent notices to navigators" will be sent whenever an important maritime danger is known to exist near the French coast or near the coasts of neighbouring countries.

The transmission of these signals will take place after the ordinary time signals.

All transmissions will be made with a wave-length of about 2,500 metres and using the maximum power which the station has at its disposal.

Ordinary Time Signals.

At 9.55 a.m. three calls (—-—-—) will be given, followed by "ordinary time signals," then the signal "wait" (-—---).

The "ordinary time signals" commence at 9.57 a.m. and end at 10 a.m. They are transmitted automatically by means of special apparatus situated at the observatory in Paris and managed by the staff of that establishment.

The connection between this apparatus and the radio station at Eiffel Tower is established a few instants before the transmission by means of subterranean lines.

The composition of these signals is given by the illustration on p. 559.

The complete minutes 9.58, 9.59, 10.0 are therefore indicated by the end of the 3rd lines of the series of three dashes, all confusion being avoided by the fact that the signals preceding these dashes are different for each minute.

The letters X (— - - —) of the first minute constitute only advice and tuning signals.

All the dashes, dots and spaces of dots or dashes of any one letter in the remainder of the signals are of equal duration, dashes = one second, dots = one-quarter of a second, intervals = 1 second.

The letters N (— -) which characterise the second minute commence numbers of 10 or more complete seconds plus eights, 8, 18, 28, 38, 48, and the beginning of the dots of these same letters are produced exactly at the tens of seconds 10, 20, 30, 40, 50.

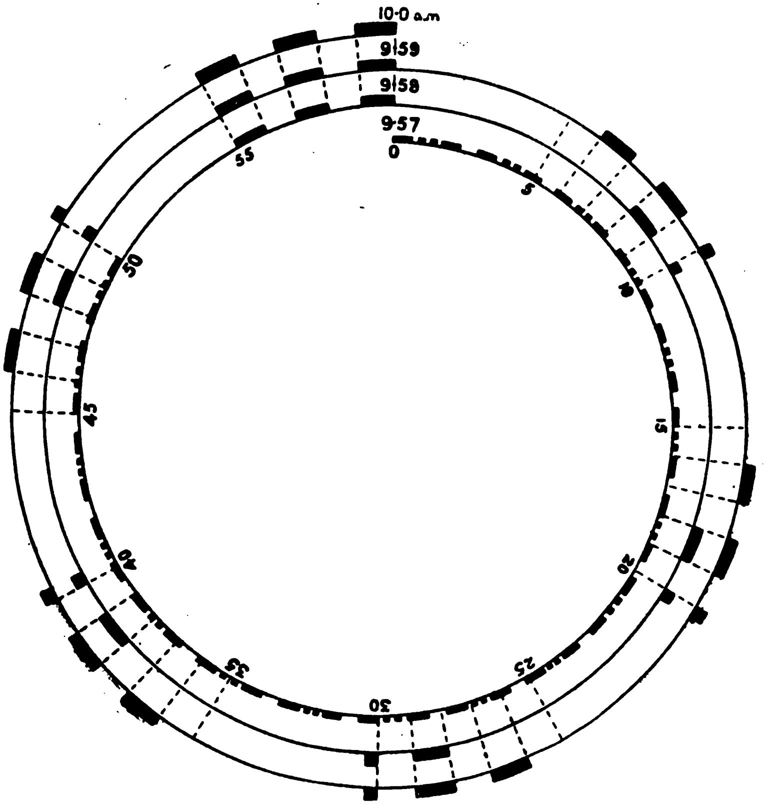
In the same way the letters G (— — -) characterising the third minute commence all numbers of 10 or more plus six, 6, 16, 26, 36, 46, and the beginning of the dots of these same letters are produced exactly at the tens of seconds, 10, 20, 30, 40, 50.

The "ordinary time signals" by night are transmitted in the same way.

The calls are made at 11.55 p.m. and the time signals are transmitted from 11.57 p.m. till midnight.

For receiving these hourly signals, termed "ordinary," it is only necessary to have the antenna, of dimensions and height

varying according to the distance from Paris, connected with a radiotelegraphic receiver, and to listen to the signals, with the clock or watch to be compared in front of the observer. It is easy for an unskilled person to estimate the difference up to half a second between the hours indicated by the clock and those which correspond with the signals that are heard in the telephones of the receiver. After some practice it is quite easy to estimate one-quarter of a second. In order to reach an accuracy of



The international service of time signals is shown in the above diagram. From the 57th minute of the hour warning signals are sent out consisting of the letter X (— · · —) repeated for fifty seconds, followed by silence for five seconds, after which the first time signal is given, consisting of three dashes each lasting for one second, separated by intervals of one second. Thus the end of the third dash coincides precisely with the end of the 58th minute. Afterwards the letter N (— ·) is sent for every ten seconds, followed by the second time signal, and finally a series of G's (— — ·) followed by a third time signal, the last dash ending precisely at the hour.

one-tenth of a second, it is in general necessary to have recourse to simultaneously recording on the same photographic strip the radiotelegraphic signals and the beats of the

clock to be compared. Excellent results have in this way been obtained by various physicists and engineers. It frequently occurs, especially in winter, that the Paris observatory is not able to make astronomical observations each night. It is therefore necessary to be satisfied with the times registered by the chronometers of which the rate is known for the setting of the clock which sends the signals. These chronometers, being sufficiently numerous and accurate, cause no inconvenience so long as the cessation of astronomical observations does not exceed a few days. If, on the other hand, the period of cloudy weather continues too long, it is no longer possible to answer for the accuracy of the chronometers. Wireless telegraphy in such cases furnishes a method which allows of the co-operation of other observatories, better situated as regards climatic conditions, in the determination of the state of the master-clock at Paris, and in consequence in the accurate setting of the clock which sends the signals.

Scientific Time Signals.

Every night at 11.44 p.m. three calls (— - — - —) are made, followed by the words "scientific time signals."

Starting at 11.45 p.m. a series of 300 dots each formed of a single spark are transmitted, the 60th, 120th, 180th and 240th being suppressed in order to establish the indication for counting purposes.

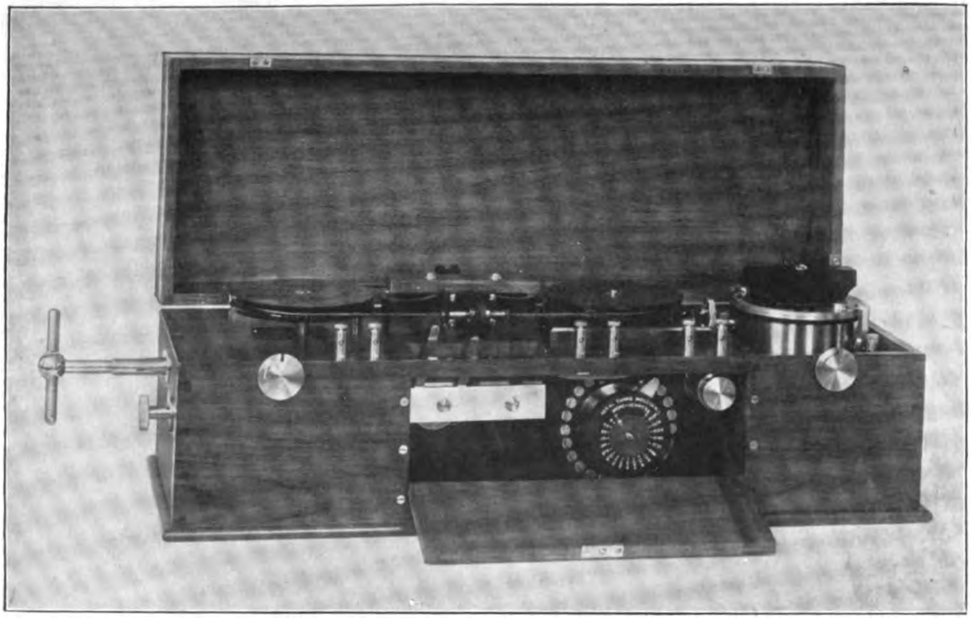
This series is heard (1) at the observatory in Paris in a wireless receiver and compared with the tickings of a time-keeping clock by the coincidence method. A simple calculation permits of passing hours (noted by the clock), of the coincidences to those which are exact to 1 or 2 hundredths, of the 1st and 300th dots of the series, which may be transformed in " legal time hours " by adding the corresponding correction of the clock.

These latter hours are transmitted by the Eiffel Tower soon after the end of the " ordinary time signals " by night, in the following manner :—

If the hours of the first and 300th beats are, for instance, 11.45 8 secs. 15 and 11.50 p.m. 1 sec. 17, the two following groups of figures three times repeated would be transmitted :—

— - - - — 450815. 500117 — - - - — 450815. 500117
— - - - — 450815. 500117.

In order to know approximately the correction to be made to a clock (or a chronometer) with reference to the legal international time of the observatory, it is sufficient to listen to the ticking of that instrument by means of a microphone suitably attached to



Magnetic Time Signal Receiver.

To face page 560

a radiotelegraphic receiver at the same time as the series of 300 points are transmitted by the Eiffel Tower. It is necessary to observe and note the coincidences, and then the hours of the clock (or the chronometer) should be calculated at the moment of the 1st and 300th dots.

By subtracting these hours respectively from those sent out by the Eiffel Tower, it is possible to obtain two values of the correction of the instrument for measuring time which should be correct to about two-hundredths.

Apart from these time signals there are a number of signals connected with the meteorological service. These are of two kinds, the first of them affording an indication of the barometric situation of Europe as a whole, and derived from information supplied by Iceland, Ireland, France, Spain, the Azores, ana America; the second of them sending out similar information regarding the state of the weather for fourteen stations in Western and Mid Europe, from Stornoway to Rome, from Prague to Biarritz and Stockholm. These telegrams are, of course, all coded, and numerals are employed to convey intelligence concerning the strength and direction of the wind, the state of the sky, and the state of the sea.

These reports are preceded by the initial letters BCM (Bureau Central Météorologique).

(1) The morning report is transmitted at 10.49, immediately after the time signals commencing at 10.45 a.m. This time may be modified at a later date when the new time signals come into force.

(*a*) Six groups of 7 or 8 figures indicating the barometric pressure, the direction of the wind, state of the sky, and state of the sea. (This last figure appears in the groups containing 8 figures.) These groups are preceded by one or two initial letters indicating the name of the station referred to. R = Reykiavik (Iceland); V = Valentia (Ireland); O = Ushant (Brittany); CO = La Carogne (Spain); HO = Horta (Azores); SP = Saint Pierre (America).

(*b*) Following the six groups of figures general atmospheric conditions for various parts of Europe are telegraphed in plain language (French).

(*c*) Groups of 7 or 8 figures giving the same observations for Paris: C = Clermont-Ferrand; BI = Biarritz; M = Marseilles; N = Nice; A = Algiers; SY = Stornoway; SH = Shields; HE = Helder

(Holland); SK = Skudesnaes (Norway); ST = Stockholm; P = Prague; T = Trieste; R = Rome.

(*d*) General forecasts for France concerning the state of the sky and wind.

(*e*) The direction and force of the wind at the Eiffel Tower, 305 metres above ground, and probable wind for evening. This last information, for the use of aeronauts, is preceded by the initials FL; the velocity of the wind is indicated in metres per second.

Second Weather Report.—A second report is sent at 5 p.m. It amplifies the morning report and takes into account variations which have been observed since 7 a.m., and to give a more precise forecast for the next day.

(*a*) The report consists of 8 groups of figures similar to the morning report for the following places: Paris: BR = Brest; BI = Biarritz; N = Nice; V = Valentia; SK = Skudesnaes; R = Rome; CO = La Corogne.

(*b*) Forecasts of the weather.

(*c*) The direction and velocity of the wind at the Eiffel Tower at 4 p.m. and a forecast for the wind and weather for the following morning. The report is made from observations made at 2 p.m.

Example of Morning Weather Report.

BCM — R5132811 — V57422445 — O64522544 — CO67530183 - - - - - Depression N.W. Europe forte pression S.W. Paris 6512031 * * * * * * Probable vent W. modéré averses Nord et Est—FL SW. 13 probable W. 10.

Example of Evening Weather Report.

BCM—Paris 6262030 — BR65224455 — BIXXXXXXXX—N62222211 — V60022425 — SK36024655 — R6142030—CXXXXXXXXX—Baisse barometrique Baltique stationnaire—Manche—Vents tournant N.W. fortes Manche Mediterranée. Averses—FL W. 10 probable W. 8.

The translation of the above is effected in the following manner: The first three figures represent the barometric pressure in millimetres and tenths of a millimetre, the figure 7 always preceding the figures telegraphed; the 4th and 5th figures indicate the direction of the wind; the 6th the force of the wind; the 7th the state of the sky; the 8th the state of the sea.

The first group in the morning report is R5132811, which is translated below.

R = Reykiavik; 513 indicates that the barometric pressure was 751·3 millimetres; 28 = direction of the wond, N.W.; 1 = force of the wind, nearly calm; 1 = sky, slightly cloudy.

The second group, V57422445.

V = Valentia; 574 = barometric pressure, 757·4 millimetres; 22 = direction of the wind, W.S.W.; 4 = force of wind, moderate; 4 = state of sky, covered; 5 = state of sea, very choppy.

When observations have not come to hand XX is sent; thus the third group of the evening report is BIXXXXXXXX, which signifies that the report from Biarritz had not arrived in time to be dispatched from FL.

Code for the Reading of Telegrams.

A group of any kind may be read as follows:—

e.g. N a a a d d f c m:

N = simple or double initial of the station.

a a a = Three figures giving the barometrical pressure to the 10th of mm. It is necessary to add 700 to arrive at the exact pressure—*e.g.* = a a a = 625 means that the pressure is 762·5.

d d = Two figures indicating the direction of the wind (see Table 1).

f = A figure giving the force of the wind (Table 2).

c = A figure giving the state of the sky (Table 3).

m = A figure giving the state of the sea (Table 4).

An observation which is not given is shown by letters x x.

Table 1.

4th and 5th Figures.

Direction of Wind.	
02	N.N.E.
04	N.E.
06	E.N.E.
08	E.
10	E.S.E.
12	S.E.
14	S.S.E.
16	S.
18	S.S.W.
20	S.W.
22	W.S.W.
24	W.
26	W.N.W.
28	N.W.
30	N.N.W.
32	N.
00	No wind (calm).

Table 2.

6th Figure.

Force of the Wind.	Designation. Velocity in Metres per Second.
0 = Calm	From 0 to 1
1 = Almost calm	,, 1 ,, 2
2 = Very weak, slight breeze	,, 2 ,, 4
3 = weak = little breeze	,, 4 ,, 6
4 = Moderate = nice breeze	,, 6 ,, 8
5 = Fairly strong = good breeze	,, 8 ,, 10
6 = Strong = fairly fresh	,, 10 ,, 12
7 = Very strong = very fresh	,, 12 ,, 14
8 = Violent = windy	,, 14 ,, 16
9 = Storm	Above 16

TABLE 3.
State of Sky.
7th Figure.

0	Fine.
1	Slightly cloudy.
2	Cloudy.
3	Very cloudy.
4	Overcast.
5	Rain.
6	Snow.
7	Mist.
8	Fog.
9	Storm.

TABLE 4.
State of the Sea.
8th Figure.

0	Calm.
1	Very smooth.
2	Smooth.
3	Slightly choppy.
4	Choppy.
5	Rough.
6	Very rough.
7	High.
8	Very high.
9	Raging.

SIGNALS OF MEASURE.

As the same length and strength of wave is always used in the transmission of time signals it is interesting, from the technical point of view of wireless telegraphy, for those making observations at different distances from the Eiffel Tower to compare the intensity of the reception of signals, by day and by night, at different times of the year. In order to facilitate these measures and comparisons of intensity, special signals are sent out for 1 minute at 9.52 a.m. and at 11.52 p.m. They are composed of 6 dashes, each one lasting 5 seconds and separated from each other by intervals of 5 seconds and preceded by 3 calls (— - — - —).

URGENT INFORMATION TO NAVIGATORS.

The use of the Eiffel Tower radiotelegraphic station for the sending of "urgent information to navigators" in case of grave maritime danger on the French coast, or even of neighbouring countries, is being considered.

Note.—The time at which the whole of the above regulations will come into force has not yet been decided. At the second International Time Conference, held in Paris in October, 1913, the question of definitely putting them into operation was discussed, and it was finally decided to postpone doing so.

GERMANY (NORDDEICH).

The Imperial Radiotelegraph Station, Norddeich, emits twice daily time signals indicating the Greenwich mean time at noon and at midnight, *i.e.,* according to the European mean time usual in Germany, the hours 1 p.m. and 1 a.m.

Time signals are sent out by the Norddeich Station in the following manner at 12.53 p.m. (noon) and at 12.53 a.m. (mid-

night), mean European time. Norddeich sends out at first, for two minutes continuously, the signal - - - - —; so that all stations desiring to receive the time signal can tune their receiving apparatus to the wave-length of Norddeich. After a longer interval then follows, at 12.57.47, the signal — - — - - - (attention), whereupon another longer interval follows, and after that, at 12.58.38, again the signal — - — - — (attention) is sent out. Another short interval is followed by the real time signal.

This signal consists of two groups of three, each lasting 5 seconds, and arranged so that each group ends with a full tenth-second, and the last dash of the last group indicates the time—1.0 mean European time. These signals consist of dashes lasting one second. The whole time signal therefore is sent, after the second signal of attention (— - — - —) has been given, and after the short interval has elapsed, in the following manner :—

12 h. 58m. 46s., 47s., 48s., 49s., 50s. :
One dash from second to second.
Interval of 5 seconds.
12h. 58m. 56s., 57s., 58s., 59s., 60s. :
One dash from second to second.
Interval of 5 seconds.
12h. 59m. 6s., 7s., 8s., 9s., 10s. :
One dash from second to second.
Long interval.
12h. 59m. 36s., 37s., 38s., 39s., 40s. :
One dash from second to second.
Interval of 5 seconds.
12h. 59m. 46s., 47s., 48s., 49s., 50s. :
One dash from second to second.
Interval of 5 seconds.
12h. 59m. 56s., 57s., 58s., 59s., and 1h. 0m. 0s. :
One dash from second to second.

The last dash indicates the time—1h. 0m. 0s. mean European time—and is distinguished by the following concluding signal :—
- — - — -

In order to ensure punctual transmission of the time signal, the Norddeich Station is equipped with a special astronomical precision clock which is regulated by the Imperial Chronometer Observatory in Wilhelmshaven. This clock automatically actuates the radiotelegraph apparatus at the indicated times so that the signals are transmitted with the maximum exactness

possible. In case a time signal is transmitted indistinctly or incorrectly, the attention of the receiving stations is called to this fact by transmitting immediately after the time signal the words: "Time signal void."

HOLLAND.

On August 1st the Scheveningen Port coast station inaugurated a daily service of meteorological data which is transmitted to ships on request. The telegram contains the data collected from the meteorological stations: Helder, Flushing, Gris Nez, The Hague (with an indication of the state of the sea); Yarmouth, Shields, Skudesnaes, Sylt (without indication of the state of the sea).

The data given by each station consist of two groups of 5 figures made up on the basis of a table BBBWW SHTTG.

BBB gives the atmospheric pressure in millimetres and tenths of millimetres, omitting the hundreds figure of the millimetres;

WW shows the direction of the wind according to the compass-card (Table 1, p. xx.);

S shows the force of the wind according to the Beaufort scale (Table 2, p. xx.).

H gives the state of the sky and the weather according to the code of Table 3, p. xx.;

TT gives the temperature in degrees Centigrade. Temperatures below zero are indicated by the addition of the number fifty to the number showing the degrees of frost, so that, for example, a temperature of —14 degrees is shown as 64;

G shows the state of the sea according to Table D. When the state of the sea is not shown, the second group of the station in question contains only four figures.

Where necessary, the groups of figures are followed by an advice regarding the storm signal.

UNITED STATES.

The United States Agricultural and Navy Departments are now sending wireless storm warnings and general weather forecasts to ships at sea. Bulletins are sent out from the navy wireless stations at Radio, Va., and Key West, Flo., a few minutes after 10 o'clock every night. These bulletins consist of two parts. The first gives, in code letters and figures, the actual weather conditions, at 8 p.m. (75th meridian time), at Sydney, Nova Scotia,

Nantucket, Atlantic City, Hatteras, Charleston, Key West, Pensacola, and Bermuda, followed by a special forecast of the probable winds to be experienced one hundred miles off shore. The second part gives the storm warnings covering a period of forty-eight hours from the time of issue, and at the end of the forecast is given a statement of the location and movement of any barometric depressions that may be likely to affect the winds over the ocean. The distribution of wireless weather bulletins by the stations at Arlington and Key West is a part of the purpose for which these stations were originally designed. The following stations in the United States send out bulletins :—

Station.	Time of Transmission.	Wave Length.
Arlington, Va.	Mid-day and 10 p.m. by time 75° West of Greenwich	2,500
Boston, NAD Charleston, S. Carolina Key West, Flo. New Orleans Newport, Rhode Island New York, NAH Norfolk, Va.	Mid-day by time 75° West of Greenwich	1,000
Eureka, Cal. Mare Island North Head San Diego, Cal. Tatoosh	Mid-day by time 120° West of Greenwich	1,000

JAPAN.

The Japanese shore station at Choshi transmits time signals every night, except Sundays, at 9 to 9.4 p.m. by time 135° East of Greenwich.

AUSTRALASIA.

The Dominion Meteorological Bureau of Wellington and the shipping companies have arrived at an agreement with the Commonwealth Meteorological Office at Melbourne for the exchange of news and meteorological information.

Ships will give information concerning the state of the weather when they are 300 or more miles from the coasts of Australia or New Zealand, or whenever the captain may consider that the atmospheric conditions offer special interest. As concerns Australia all ships which approach or leave Cape Leeuwin will report concerning the atmospheric conditions which prevail.

Until further orders such messages delivered on board will be sent without previous payment, provided they conform to the following conditions :—

1. That they are written in the special code of the Meteorological Offices and a copy of them shall be supplied to the said offices.

2. That the messages shall be drawn up by the responsible officer (" observer "), and not by the operator.

3. That for their delivery they shall be addressed with the indication " Melbourne time " or " Wellington time."

4. They shall not deal with other than the following points :—

a. Position of the ship.

b. The barometric reading.

c. The direction and velocity of the wind.

d. The state of the weather.

e. The condition of the sea.

and they shall be written in the prescribed form.

All telegrams as a rule shall be immediately forwarded by the quickest route and shall have priority as a Government message. For these the Marconi tax will not be collected.

Every morning, at 11 o'clock, reports upon the weather and other exceptional conditions prevailing will be sent in all directions by the coast stations of the respective Governments. Special attention will be exercised with these reports and they will be recorded and delivered to the captain of the ship as though they were Service messages. Upon the operators taking watch, and when approaching the coast of Australia, they shall ascertain if the last advices are still in force or whether other news has been transmitted, in which case they shall request its repetition by the coast station. The times of transmission of weather forecasts between 7 p.m. and midnight by the coast stations at Hobart and Brisbane are : Hobart, 10 p.m. and 11 p.m. ; Brisbane, 10.30 p.m. and 11.30 p.m.

SOUTH AFRICA.

The radiotelegraphic stations at Capetown and Durban signal at 1 o'clock in the afternoon of each day weather reports containing information relative to the meteorological conditions affecting the coastal belt of the South African Union.

MEXICO.

The following Mexican stations transmit time signals at midday by meridian of Tacubaya: Campeche, Guaymas, Mazatlan de Sinaloa, Payo Obispo, Veracruz de Veracruz.

GREAT BRITAIN.

At 9.30 a.m. the Admiralty station at Whitehall, in London, sends out a meteorological bulletin. At 10 o'clock the Cleethorpes weather report and forecast is sent out, this lasting about 20 minutes. Whitehall sends out an additional bulletin at 8.30 p.m., Cleethorpes at 10 p.m. The following is a speciment of the Cleethorpes weather report, which is preceded by the call signal CQ. CQ. CQ.

"Pressure above 30 I. over England and North France, 29·0 over Northern Iceland, gradient fairly steep."

Forecast:—"Scotland and North Ireland, south-westerly breezes, freshening; sea smooth to rather rough; fair or fine; some rain to-night; other regions, calm and light variable airs, smooth sea, fine generally, some mist."

RADIO-TELEGRAPHIC INVESTIGATIONS

Work of the British Association Committee

By W. Eccles, D.Sc.
(*Secretary to the Committee*).

AT the Dundee meeting of the British Association (September, 1912) an interesting debate, opened by Prof. Fleming, took place on the problems raised by Wireless Telegraphy, and as a consequence the Mathematical and Physical Section of the Association appointed a Committee to see what could be done in the way of furthering radiotelegraphic investigation. The Committee consisted of Mr. S. G. Brown, Dr. C. Chree, F.R.S., Dr. W. Eccles (Hon. Secretary), Prof. A. S. Eddington, M.A., Dr. J. Erskine-Murray, Prof. J. A. Fleming, F.R.S., Prof. G. W. O. Howe, Sir Oliver Lodge, LL.D., F.R.S. (Chairman), Prof. H. M. Macdonald, F.R.S., Sir Henry Norman, M.P., Captain H. Riall Sankey, R.E. (retired), Dr. A. Schuster, F.R.S., Dr. W. N. Shaw, F.R.S., and Dr. S. P. Thompson, F.R.S.

One of the facts that appealed strongly to the Committee when they met was that there were numerous amateurs scattered about the country who were waiting, one might say, for a lead in wireless telegraph investigation. Without some lead, such as might be offered by the Committee—or alternatively in occasional instances by a friendly expert or man of science—many an amateur will do little with his apparatus except tap the messages that happen to fly over his station, or take down the time, or play at telegraphy with another amateur in the locality. The Committee, when they came to survey the field open to radio-telegraphic research, kept in mind the possibility of obtaining the assistance of amateurs, and in arriving at a decision they tried to settle upon branches of research that were both important and, in the circumstances, feasible.

Every point of view that occurred to the Committee urged

them to promote the investigation of such of the mysteries of wireless telegraphy as are met with by observers distributed over a wide area—that is to say, of such phenomena as occur on the grand scale.

Chief among these universal phenomena is that of the natural electric waves which have coursed about the globe since the most remote ages, but the existence of which was completely unsuspected till very recent times. These natural electric waves cause erratic and troublesome noises in the telephone receivers of a wireless telegraph station, or cause erratic and confusing marks on the tape of a coherer and inker set. They are only too familiar to everyone who has worn the 'phones of a wireless operator for even a brief interval. For brevity they were christened "strays" or "X's" in the years 1897, 8 and 9 in England, and were later given the name "atmospherics" in the United States. Another and more recent Americanism is "static." The best name appears to the writer to be "strays," for the word exactly describes their vagrant nature, and does not commit one to any opinion as regards their origin. The much-used word "atmospheric" suggests that they are wholly due to discharges of atmospheric electricity, and no doubt the word "static" is intended to convey the same idea. "Atmospherics" is, besides, a dreadfully long word to have to write often. From the point of view of brevity "X's" is the best term, but it is not quite accurate. On the whole, from the point of view of priority, of accuracy, of freedom from ambiguity, and of the absence of bias—not to mention reasonable brevity—the writer favours the term "stray" as the best short term for a natural electric wave-train, with "X" as a good variant. The latter term may be held to include, as "stray" does not, the noises caused by discharges of local atmospheric electricity down the antenna.

Now, to the scientific mind, the chief claim of strays to promptness of attention is that nobody knows completely what they are or whence they come. The study of strays was begun by Popoff shortly before the rise of practical wireless telegraphy. In 1895 Popoff made use of a long vertical conductor (such as a lightning rod) in combination with a coherer, in order to follow the motions of lightning storms across the country. A filings coherer was used, and was automatically tapped back after registering the effect of each lightning stroke. In 1898 Boggio Lera improved on Popoff's apparatus as regards sensitiveness, and arranged that feeble and strong disturbances should be

recorded separately. His experiments with this apparatus in 1899 showed that the approach of electrical storms was heralded by frequent operation of the apparatus several hours in advance of their arrival in the locality of the observing station, and showed also that every visible flash operated the apparatus infallibly. These results were confirmed in 1900 by Tommasina using his carbon auto-decoherer. In 1901 Fenyi showed that the thunderstorms occurring within 100 kilometres of his station at Kalocsa, Hungary, were all recorded by his coherers. Finally, Turpain, in 1903, made a long series of observations which proved the possibility of utilising radiotelegraphic apparatus in the forecasting of thunder weather for hours and even days in advance.

But even when there is no thunder weather recorded over the whole continent of Europe and the adjacent seas, X's may be received almost perpetually by a receiving antenna adjusted to a great wave-length. This is quite a distinct matter from the X's due to local atmospheric electricity utilising the antenna as a lightning rod, and different again from the hum or sizzle or fizz caused by a white squall at sea or by glow discharge to high peaks. These perpetual strays are characterised by the fact that they are heavier and more frequent, in general, the longer the wave to which the receiving antenna is adjusted, so far as has been tried up to the present. It is natural, but it is not scientific, to jump to the conclusion that these strays are all due to lightning strokes occurring probably at great distances somewhere on the earth's surface, or possibly in the free atmosphere between one bank of ionised air and another. This, however, ignores the possibility that the source of the strays may be far outside the earth. There is nothing unreasonable in supposing that the sun, let us say, may send us occasional electric waves. For example, in the colossal movements of matter associated with the formation of a solar prominence—movements that appear to take place with enormous velocities—electric discharges may be brought about of magnitude far transcending anything that can happen on the earth. These would give rise to electric waves which might reach the earth in perceptible intensity and constitute a proportion of our strays. On the other hand, we must not forget that we on the earth's surface may be protected by our ionised atmosphere from these extra-terrestrial waves. It is just such problems as these that the British Association Committee has set itself to inquire into. The exact methods being pursued in this matter are described fully below.

Another and distinct inquiry which urgently needs pursuing has regard to the part played by the earth's atmosphere in causing variations in signal strength. The laws of these variations, especially in respect of their connection with weather conditions, with the time of day, and with position on the earth's surface, require investigation. The time of day has effects that include the now well-known sunset and sunrise variations; and, as regards the other points mentioned, we only know at present that the barometric height does affect signals and that the barometric height is associated with geographical position in very definite and remarkable ways. In order to learn more we must have observations made simultaneously at various parts of the world and collated at a central office.

In proceeding to draw up a scheme of research the Committee had to keep several points before them. In the first place, the investigation of long-distance or universal phenomena requires a great many widely-dispersed observers and installations. In the second place laboratories possessing refined apparatus for radio-telegraphic measurements are not very common. In the third place, the measurement of the small currents that circulate in the receiving apparatus of wireless telegraph stations is not easy, and thus for strictly quantitative work, time and money would have to be spent in the design and development of improved instruments and methods. These considerations impelled the Committee to organise the making of such observations as might be carried on by means of the ordinary plant in any commercial or experimental stations, and to a great extent by the voluntary efforts of telegraph operators and amateurs not specially trained to the arts of the physical laboratory. Moreover, in order to obtain the goodwill of authorities owning stations and employing operators, the scheme of work had to fulfil the condition that it should offer the minimum interference with the proper work of the stations.

A scheme of work was finally decided upon in June, 1913. It is best described by reproducing the Forms, Explanatory Remarks, and Detailed Instructions distributed to observers. Four kinds of Form have been issued up to the present, and they have all been drawn up with the needs of English-speaking sea-going operators chiefly in mind. Specimens of the forms are shown on the following pages.

EXPLANATORY REMARKS CONCERNING FORM 1.*

STRAYS.

Three kinds of strays (X's) are commonly heard during the telephonic reception of signals. One is a more or less prolonged rattling or grinding noise ("grinders"); another kind consists of sharp isolated knocks ("clicks"); and a third consists of a buzzing or frying noise ("hum" or "sizzle"), and is often heard during a white squall.

Form 1 is designed for the collection of statistics concerning these different kinds of strays.

A separate sheet should be used for each day's observations, but it is not expected that every section will be filled each day. Even if a sheet be only partially filled on one date, another should be used for recording observations made on another date.

11 a.m. and 11 p.m.—The first section is for recording observations made at 11 a.m. and 11 p.m., Greenwich Mean Time. If accurate information can be obtained of X's occurring about these times all over the world, it may be possible to discover, for example, if there are any areas over which X's tend to occur simultaneously. Since the character and number of X's received will differ greatly with the wave-length to which the receiving apparatus is adjusted, observations on two wave-lengths (about 600 metres and about 2,000 metres) are asked for; observers possessing the necessary apparatus may add records made with about 5,000 metres wave-length.

X STORMS.—The second section is to be used when strays are unusually loud or numerous. Here, again, observations should be made separately with the receiving apparatus tuned to 600 metres and to 2,000 metres (and, if possible, to 5,000 metres), the observations at each wave-length being recorded on a separate line. If the time of the storm's beginning and ending can be decided accurately to a quarter of an hour, it may be possible to settle wheter any of these storms are due to causes outside the earth and its atmosphere. The record of the weather at the time is important, and the presence of squalls, or lightning, or thunder, or auroræ should be specially noted.

* Special reports will be welcomed by the Committee. They should be written on the back of the form immediately behind the table dealing with the corresponding subject, so that the report will not be divided when the sheet is cut up into its constituent sections for classification. For example, any coincidence between the beginning and end of a "freak" period with the beginning and end of an auroral display should be mentioned at the back of the second table under "Signals."

X's at Twilight.—The third section is for observations at sunrise and sunset. The strays heard in daylight are normally weaker than those heard during the hours of darkness. The change from one condition to the other is often rather sudden, and it is desirable to ascertain the connection between this change and the time of sunrise or sunset at various places on the globe. The apparatus should be adjusted to the greatest wave-length possible, since the change is then most noticeable. The observations must extend 15 minutes on each side of the time of change, and at sea it will be desirable to get from the bridge the time when the sun is on the horizon to within 5 minutes.

When strays are very numerous they may often be thinned out for counting by loosening the coupling between the antenna and its secondary circuit; but, if possible, a standard adjustment of the coupling should be decided upon and adhered to.

The figures mentioned above as desirable wave-lengths are merely suggestions; the Committee will be grateful for statistics obtained on any wave-lengths whatever.

FORM 1.—OBSERVATIONS ON STRAYS.*

Detailed Instructions.

WEATHER TABLES.

C refers to the kind of cloud visible. — Enter

Cirrus or *Curl cloud* is light, fleecy, high cloud ("mackerel sky," "mares' tails," etc.) ... ... *a*

Cumulus is massy, woolly cloud in rounded shapes ... ... *b*

Stratus is layered cloud ... ... *c*

Nimbus is low, dark cloud from which rain is falling ... ... *d*

or two of these letters.

F refers to the fraction of the sky covered by cloud ... ... *0* to *10*
If no cloud enter 0, if sky wholly covered enter 10.

B.Q. indicates the brightest quarter ... ... *1* to *8*
NE=1, E=2, SE=3, S=4, SW=5, W=6, NW=7, N=8.

W wind; *d* and *f* refer to its direction and force (information from bridge).

Express direction by numerals as for B.Q. ... ... *1* to *8*

Express force of wind by the following scale:—

		Miles per hour.			Miles per hour.	
0	Calm	(Less than 1)	7	Moderate gale	(32 to 38)	*0* to *12*
1	Light air	(1 to 3)	8	Fresh gale	(39 „ 46)	
2	Light breeze	(4 „ 7)	9	Strong gale	(47 „ 54)	
3	Gentle breeze	(8 „ 12)	10	Whole gale	(55 „ 63)	
4	Moderate breeze	(13 „ 18)	11	Storm	(64 „ 75)	
5	Fresh breeze	(19 „ 24)	12	Hurricane	above 75	
6	Strong breeze	(25 „ 31)				

(The numbers refer to the mean velocity, not to the velocity of gusts.)

* See Footnote on page 576.

	Enter
B refers to barometric height. State height, and whether the barometer has risen or fallen since last entry in ship's log	*Height* and *r* or *f*
T refers to the thermometer. State temperatures of air and sea, and whether they have risen or fallen since last entry in log	*Temperature* and *r* or *f*
P State whether there is rain = *r*, snow = *s*, hail = *h*, fog = *f*, lightning = *l*, thunder = *t*, dry weather = *d*, auroral display = *a*. Capital letters will mean great intensity—*e.g.*, R = heavy rain	*Small letter* or *Capital.*

SCALE OF SIGNAL STRENGTH.

			Enter
1, 2, 3, 4 — Weak	5, 6, 7, 8 — Medium	9, 11, 10, 12 — Strong	*1* to *12*

STRAY TABLES.

11 a.m. and 11 p.m.—First Table.—Near 11 a.m. (Greenwich Mean Time) tune apparatus to about 600 metres and enter observations on first line; then tune to about 2,000 metres, an denter observations on second line; then, if possible, tune to about 5,000 metres and enter observations on third line.

Near 11 p.m. (Greenwich Mean Time) repeat the above procedure.

To get frequency count strays (grinders and clicks separately) however faint heard in one minute, or, if convenient, count strays heard in several minutes, divide by number of minutes and enter *av* = ... Average strength is to be expressed by the Scale of Strengths above. In the first column enter G.M.T. of beginning of the counted minute; in the second column the L.M.T.

X Storms—Second Table.—Tune apparatus to about 600 metres and enter observations in first line; then to about 2,000 metres and enter in second line, and so on. Repeat later when conditions appear to have changed.

Enter under frequency: *c* for continuous; *m* for many; *f* for few; *n* for none.

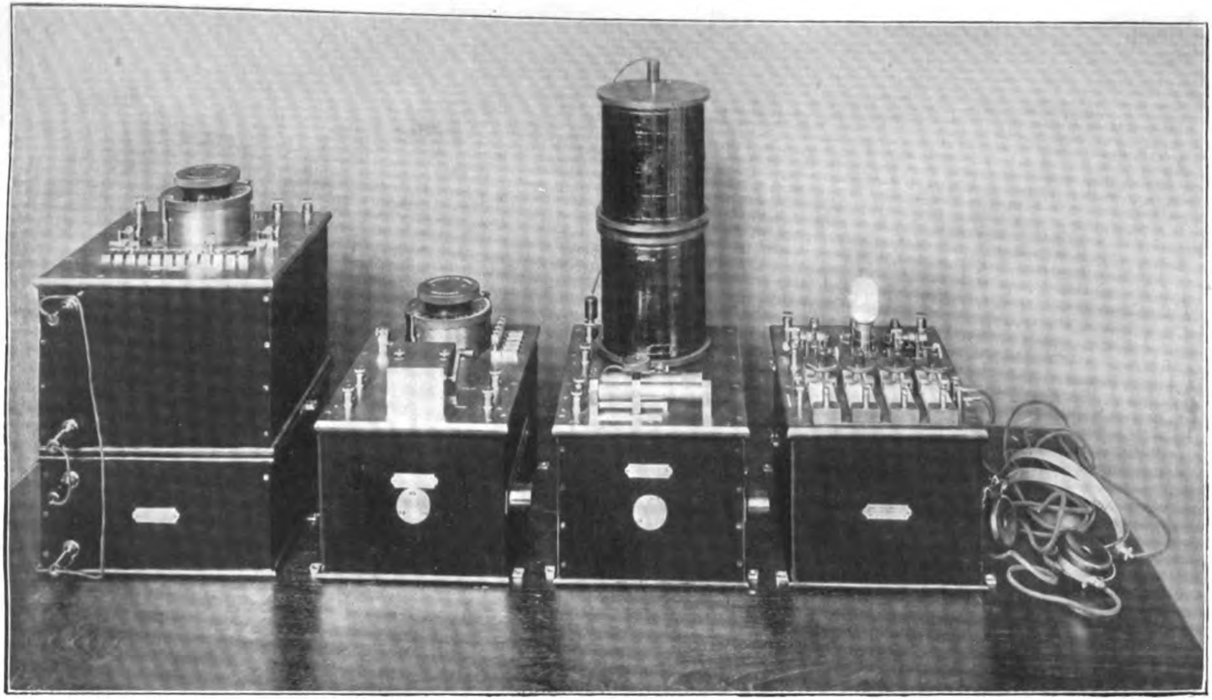
The table is intended for a single storm of long duration or for two shorter storms; enter G.M.T. of beginning and end below the table. If several distinct X storms occur on the same date, and if there is not room on the sheet, take a separate sheet.

X's at Twilight—Third Table—Sunrise.—At head of table enter longitude and latitude and G.M.T. of sunrise (from the bridge).

At about 15 minutes before time of change count all the audible grinders and clicks in a minute; enter this number at bottom of first column and enter above it G.M.T. of the beginning of the count. Repeat at about 10 minutes before time of change, entering in second column; and again at about 5 minutes before and again at time of change. Repeat at 5 minutes, 10 minutes and 15 minutes after time of change. The intervals between the counts need not be perfectly regular. Fill Weather Table. *Sunset* observations follow the same course. Ignore hum or sizzle unless remarkable.

---

* Observers at fixed stations need not enter longitude and latitude, or other information concerned with moving stations, and should enter Standard Time in spaces for L.M.T.



Long-Wave Wireless Receiver.

OBSERVATIONS ON STRAYS (X's)

Form 1.

Day of Week...... **Name of Station or Ship and Line** .... **Approx. long......lat......at local noon.**
Ship's Course and Speed..................

Date.................. **Signature of Observer ....**

Frequency means number per minute. Tune to a short wave and a long wave in turn, and also to a very long wave, if possible.
During X-storms enter under frequency :—c. for continuous ; m. for many ; f. for few ; n. for none

	Position.	G.M.T.	L.M.T.	Wave length	Grinders. Frequency.	Grinders. Strength.	Clicks. Frequency.	Clicks. Strength.	Hum or Sizzle. Strength.
11 a.m.	Long.								
	Lat.								
G.M.T.	Long.								
11 p.m.	Lat.								
X storms.	Long.								
	Lat.								
	Long.								
	Lat.								

Weather.	11 a.m.	11 p.m.
C. & F. ...		
B.Q.		
W.: d		
f		
B.*		
T.* air		
T.* sea		
P.		

*Rising or falling.

X-Storm began .... G.M.T.

X-Storm finished .... G.M.T.

X-Storm began .... G.M.T.

X-Storm finished .... G.M.T.

Weather.	
C. & F. ...	
B.Q.	
W.: d	
f.	
B.*	
T.* air.	
T.* sea.	
P.	

*Rising or falling.

TWILIGHT OBSERVATIONS. **Wave length.**

Long.................... Lat....................	G.M.T. of Sunrise..............								Long......... Lat..........	G.M.T. of Sunset.						
G.M.T. of observation..............																
Frequency																

Weather.	
C. & F. ...	
B.Q.	
W.: d	
f.	
B.*	
T.* air.	
T.* sea.	
P.	

*Rising or falling.

If observer can listen continuously the G.M.T. when X's change perceptibly in strength or frequency should be entered here.

Sunrise ....

Sunset ....

REMARKS.

....

....

Weather.	
C. & F. ...	
B.Q.	
W.: d	
f.	
B.*	
T.* air.	
T.* sea.	
P.	

*Rising or falling.

EXPLANATORY REMARKS CONCERNING FORM 2.

SIGNALS.

The accurate measurement of signal strength is not possible with the apparatus normally available in a station; the tables are arranged for recording such statistics as can be collected without special apparatus.

TIME SIGNALS.—The first section is for recording the strength of any time signals received by the observer (the Eiffel Tower, Norddeich, Arlington, etc.). The strength of the signals is to be indicated in accordance with the *Table of Strength* in the Detailed Instructions.

The chief precautions to be taken are: (1) the coupling between antenna and secondary should be the same on all occasions; (2) the apparatus used, including telephones, should be the same, and (3) the detector should always be of the same sensitiveness. This last condition is not easily ensured except, perhaps, in the case of the magnetic detector.

"FREAKS."—Good transmission is very common in the hours of darkness, but only those cases where the range is considered to be better than the average need be recorded. At sea the position of the transmitting station is best obtained telegraphically. The weather record is important.

BAD TRANSMISSION.—The last section is not intended as a chronicle of unskilful manipulation of the sending or the receiving apparatus, but for cases where the state of the atmosphere, or the nature of the intervening land, is likely to be responsible for the low intensity of signals. Remarks on these matters will be welcomed, and the weather record is important.

FORM 2.—OBSERVATIONS ON SIGNALS.

Detailed Instructions.

WEATHER TABLES.

C refers to the kind of cloud visible. Enter

Cirrus or *Curl cloud* is light, fleecy, high cloud ("mackerel sky," "mares' tails," etc.) ... ... *a*

Cumulus is massy, woolly cloud in rounded shapes ... ... *b*

Stratus is layered cloud ... ... *c*

Nimbus is low, dark cloud from which rain is falling ... ... *d*

or two of these letters.

	Enter
F refers to the fraction of the sky covered by cloud	*0* to *10*
If no cloud enter 0, if sky wholly covered enter 10.	
B.Q. indicates the brightest quarter	*1* to *8*
NE=1, E=2, SE=3, S=4, SW=5, W=6, NW=7, N=8.	
W wind; *d* and *f* refer to its direction and force (information from bridge).	
Express direction by numerals as for B.Q.	*1 to 8*
Express force of wind by the following scale:—	

	Miles per hour.		Miles per hour.	
0 Calm	(Less than 1)	7 Moderate gale	(32 to 38)	*0* to *12*
1 Light air	(1 to 3)	8 Fresh gale	(39 „ 46)	
2 Light breeze	(4 „ 7)	9 Strong gale	(47 „ 54)	
3 Gentle breeze	(8 „ 12)	10 Whole gale	(55 „ 63)	
4 Moderate breeze	(13 „ 18)	11 Storm	(64 „ 75)	
5 Fresh breeze	(19 „ 24)	12 Hurricane	above 75	
6 Strong breeze	(25 „ 31)			

(The numbers refer to the mean velocity, not to the velocity of gusts.)

B refers to barometric height. State height, and whether the barometer has risen or fallen since last entry in ship's log	*Height* and *r* or *f*
T refers to the thermometer. State temperatures of air and sea, and whether they have risen or fallen since last entry in log	*Temperature* and *r* or *f*
P State whether there is rain=*r*, snow=*s*, hail=*h*, fog=*f*, lightning=*l*, thunder=*t*, dry weather=*d*, auroral display =*a*. Capital letters will mean great intensity—*e.g.*, R= heavy rain	*Small letter* or *Capital.*

SCALE OF SIGNAL STRENGTH.

				Enter
1, 2, 3, 4 — Weak	5, 6, 7, 8 — Medium	9, 10, 11, 12 — Strong	... ...	*1* to *12*

SIGNAL TABLES.

Time Signals—First Table.—In both "daylight" and "dark" sections two lines are provided in case two time stations can be picked up. At sea the longitude and latitude on each occasion may be obtained from the bridge. The strength of the signals are to be expressed by the *Scale of Strength* above, the coupling and other variable parts being at the standard adjustments adopted by the observer.

"*Freaks*"—*Second Table.*—Each line should relate to a distinct observation —*i.e.*, each line must relate to a different sending station or to the case when the same sending station is picked up after being lost for a time. Strength is to be expressed by the *Scale of Strengths* above.

In the column "character" enter 1 if communication is one way only (*i.e.*, receiving), enter 2 if each station can communicate with the other. Enter *t* if the freak is of a transient character, signals being heard only a few minutes at a time, and enter *s* if it is steady and lasts more than half an hour.

Bad Transmission—Third Table.—Apply the instructions given for the last table, with the obvious verbal changes.

OBSERVATIONS ON SIGNALS

Form 2.

Day of Week...... Name of Station or Ship and Line .... Approx. long......lat......at local noon.
Ship's Course and Speed..................
Date.................. Signature of Observer ....

SIGNALS.

TIME SIGNALS

	Name of Time Station.	G.M.T.	L.M.T.	Wave length.	Observer's Long.	Observer's Lat.	Strength
Daylight at receiving station.							
Dark at receiving station.							

Weather.	Daylight	Dark.
C. & F.		
B. Q.		
W.: d.		
f.		
B.*		
T.* air.		
T.* sea.		
P.		

*Rising or falling.

EXCEPTIONALLY GOOD TRANSMISSION. ("Freaks.")

G.M.T.	L.M.T.	Strength	Wave length.	Observer's Long.	Observer's Lat.	Transmitting Station's name or call letter	Transmitting Station's Long.	Transmitting Station's Lat.	Character.

Weather.	
C. & F.	
B.Q.	
W.: d.	
f.	
B.*	
T.* air.	
T.* sea.	
P.	

*Rising or falling.

Are Strays numerous and strong during the "freak" periods?
(1) Grinders ....
(2) Clicks ....
(3) Sizzle ....

EXCEPTIONALLY BAD TRANSMISSION.

G.M.T.	L.M.T.	Strength	Wave length.	Observer's Long.	Observer's Lat.	Transmitting Station's name or call letter	Transmitting Station's Long.	Transmitting Station's Lat.	Character.

Weather.	
C. & F.	
B.Q.	
W.: d.	
f.	
B.*	
T.* air.	
T.* sea.	
P.	

*Rising or falling.

REMARKS: (1) Unusual weather during preceding 12 hours ....
(2) Intervening land? ....
(3) Are Strays few and feeble? ....

EXPLANATORY REMARKS CONCERNING GRAPHIC RECORDS, FORM 3.

STRAYS NEAR THE TIME OF TIME SIGNALS.

Three kinds of strays are commonly heard in the telephone receiver. One is a more or less prolonged rattling or grinding noise ("grinders"); another kind consists of sharp isolated knocks ("clicks"); and a third consists of a buzzing or frying noise ("hum" or "sizzle"), and is often heard during a white squall.

A number of the problems concerning the nature and source of strays require for their solution the comparison of simultaneous records made by widely-dispersed observers. Practical simultaneity over large areas has now been made easy by the institution of Time Signals, but any method of recording still demands expensive automatic apparatus. Good work may be done, however, by anyone who will acquire skill in the making of graphic records by hand. These records are made as follows: A line drawn on paper is graduated to represent time—*e.g.*, 10, 20, 30, . . . seconds; a watch with a seconds hand is placed near the graduated line, and the observer, wearing the telephones and looking at the watch, moves his pencil along the graduated line so that its point passes the graduations 10, 20, 30, . . . at the moments the seconds hand passes the same figures on its dial. Whenever the observer hears a stray he makes a mark above the line to represent the stray, thus recording the instant of its arrival. A click is represented by an up and down stroke nearly perpendicular to the line; a grinder by an irregular mark above the line, starting and ending on the line and enclosing an area. Sizzle may be represented as a low wavy mark just above the graduated line. A very strong stray may be pictured half an inch high, and a very weak one a sixteenth of an inch high or less, and so on. The exact instant of arrival of signals can be represented in the same way.

In order that the comparison of different graphic records may be valid, it is essential that the Greenwich Mean Time of some point on the graph shall be known accurately to within two seconds. This may be ensured by recording graphically the last dots or dashes of a Time Signal in the first few inches of the record. If meteorological or other signals follow the Time Signal, they should be cut out by altering the wave-length of the receiving apparatus, so that the strays can be observed in peace. The time

lost in making the change will appear as a blank space between the last mark representing the Time Signal and the first mark representing a stray. Great care should be taken to make the first stray-mark at its proper place on the graduated line, or the whole record will be useless.

If the station is outside the range of Time Signals, the observer's clock or watch must be compared with an observatory clock and the G.M.T. of starting the record deduced and stated. This time should, of course, be precisely that of one of the Time Signals. *Do not make this Graphic Record if accurate time is not obtainable.*

If the strays are too numerous to record conveniently with the customary coupling, use a looser coupling; if they are very few and weak, use a tight coupling.

FORM 3.—STRAYS NEAR TIME OF TIME SIGNALS.*

Detailed Instructions.

WEATHER TABLES.

C refers to the kind of cloud visible. Enter

Cirrus or *Curl cloud* is light, fleecy, high cloud ("mackerel sky," "mares' tails," etc.) ... ... *a*

Cumulus is massy, woolly cloud in rounded shapes ... ... *b*

Stratus is layered cloud ... ... *c*

Nimbus is low, dark cloud from which rain is falling ... ... *d*

or two of these letters.

F refers to the fraction of the sky covered by cloud ... ... *0* to *10*

If no cloud enter 0, if sky wholly covered enter 10.

B.Q. indicates the brightest quarter ... ... *1* to *8*

NE=1, E=2, SE=3, S=4, SW=5, W=6, NW=7, N=8.

W wind; *d* and *f* refer to its direction and force (information from bridge).

Express direction by numerals as for B.Q. ... ... *1 to 8*

Express force of wind by the following scale:—

		Miles per hour.			Miles per hour.	
0	Calm	(Less than 1)	7	Moderate gale	(32 to 38)	*0* to *12*
1	Light air	(1 to 3)	8	Fresh gale	(39 ,, 46)	
2	Light breeze	(4 ,, 7)	9	Strong gale	(47 ,, 54)	
3	Gentle breeze	(8 ,, 12)	10	Whole gale	(55 ,, 63)	
4	Moderate breeze	(13 ,, 18)	11	Storm	(64 ,, 75)	
5	Fresh breeze	(19 ,, 24)	12	Hurricane	above 75	
6	Strong breeze	(25 ,, 31)				

(The numbers refer to the mean velocity, not to the velocity of gusts.)

* The observer's clock or watch should be set so that the minute hand is on a division when the seconds hand reaches 60. It need not be set to read Greenwich or any particular time.

	Enter
B refers to barometric height. State height, and whether the barometer has risen or fallen since last entry in ship's log	*Height* and *r* or *f*
T refers to the thermometer. State temperatures of air and sea, and whether they have risen or fallen since last entry in log	*Temperature* and *r* or *f*
P State whether there is rain = *r*, snow = *s*, hail = *h*, fog = *f*, lightning = *l*, thunder = *t*, dry weather = *d*, auroral display = *a*. Capital letters will mean great intensity—*e.g.*, R = heavy rain	*Small letter* or *Capital*

SCALE OF SIGNAL STRENGTH.

				Enter
1, 2, 3, 4 — Weak	5, 6, 7, 8 — Medium	9, 10, 11, 12 — Strong	... ...	*1* to *12*

GRAPHIC RECORDS.—STRAYS NEAR TIME OF TIME SIGNALS.

By means of a buzzer, or by the aid of signals of known wave length (Clifden, Glace Bay, Poldhu, etc.), tune both antenna and secondary to a wave-length greater than 2,500 metres, and make a note of the adjustments. Enter the wave-length on the form. Now tune to the Time Station and listen to the Time Signals. Estimate and enter the strength of the signals and of the strays. Now begin following the seconds hand of your timekeeper, and near the finish of the Time Signals start writing down the dots or dashes in the places indicated by the seconds hand. At the close of the Time Signals set the antenna and the secondary to the adjustments noted previously, and pick up the recording of the strays at the place indicated by the seconds hand. If the strays are inconveniently numerous, reduce the coupling; if very few, increase the coupling. Immediately before or after making the graphic record, enter the longitude and latitude and fill in the weather table.

If the observer's clock or watch is compared with an observatory clock for the purpose of this Graphic Record, the G.M.T. of the start of the record should be entered after "G.M.T." In other cases enter the time given by the Signal.

GRAPHIC RECORDS

Form 3

STRAYS NEAR TIME OF TIME SIGNALS.

Day of Week...... Name of Station or Ship and Line

Signature of Observer............

Date ....

Wave length to which apparatus is set.. metres

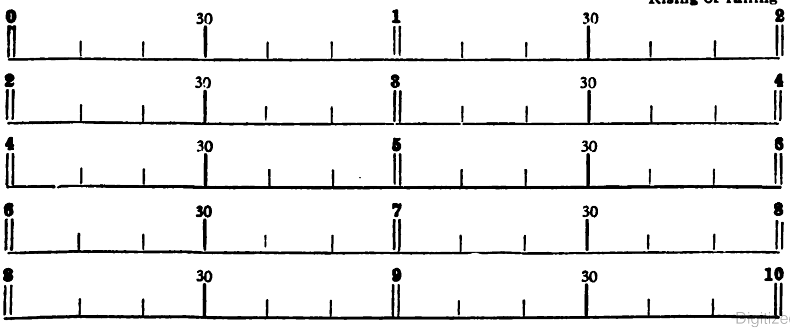
Observer's Long....................................... Lat. ....

Name of Time Station.................................... G.M.T...........................

Strength of Time Signals .... Average Strength of Strays..............

Weather.	
C. & F....	....
B.Q.	....
W.: d......	....
f......	....
B.*........	....
T.* air..	....
sea.	....
P..........	....

* Rising or falling



EXPLANATORY REMARKS CONCERNING GRAPHIC RECORDS, FORM 4.

Three kinds of strays are commonly heard in the telephone receiver. One is a more or less prolonged rattling or grinding noise (grinders "); another kind consists of sharp isolated knocks ("clicks"); and a third consists of a buzzing or frying noise ("hum" or "sizzle"), and is often heard during a white squall.

Strays at Twilight.

The rapid increase, as the sun sets, of the number of strays received at any station where the apparatus is adjusted to receive long waves is easily chronicled on a graphic record. The increase is often rather sudden, and in temperate climates usually occurs during twilight. The interval of time elapsing between sunset and the period of most rapid change may vary with position on the earth's surface and perhaps with the weather, and it is desirable to investigate this matter, if only on account of the possibility of making the phenomenon, on occasion, a substitute for "taking the sun" at sea, whenever the latter is not possible. To trace these variations, position and G.M.T. should be recorded on the form with fair accuracy. At sea both may usually be obtained from the bridge; when, however, position is doubtful, a note of interrogation should be placed after the entry of longitude and latitude. If the station is within the range of Time Signals, the G.M.T. of the beginning of the stray record is best recorded by writing down, in the spaces provided, the time as read on the observer's clock or watch of a Time Signal before, and of one after, the making of the stray record; and writing down also the time as read on the clock or watch of the start of the record. The clock or watch must not be set or regulated between the Time Signals. If the station is outside the range of Time Signals, a single comparison of the observer's clock or watch with the G.M.T. given by a good chronometer will take the place of Time Signals if made just before or just after the observations. If accurate time is not obtainable, the fact should be noted.

The process of writing down the strays received is as follows: A line drawn on paper is graduated to represent time—*e.g.*, 10, 20, 30, . . . seconds; a watch with a seconds hand is placed near the graduated line, and the observer, wearing the telephones and looking at the watch, moves his pencil along the graduated line so that its point passes the graduations 10, 20, 30, . . . at the

moments the seconds hand passes the same figures on its dial. Whenever the observer hears a stray he makes a mark above the line to represent the stray, thus recording the instant of its arrival. A click is represented by an up and down stroke nearly perpendicular to the line; a grinder by an irregular mark above the line, starting and ending on the line and enclosing an area. Sizzle may be represented as a low wavy mark just above the graduated line. A very strong stray may be pictured half an inch high, and a very weak one a sixteenth of an inch high or less, and so on.

The antenna and its secondary should be tuned once for all to a known wave-length by means of a buzzer, or by means of long-wave signals, unless already calibrated, and the coupling is best adjusted so that the strays heard in daylight are not very frequent. The coupling should not be altered during the making of a record.

At sunrise the strays decrease in number as time goes on. The work is very much the same as at sunset, the chief difference being that the coupling should, if possible, be so arranged before sunrise that the strays heard are as numerous as can be written down conveniently.

Observers making this record will, it is almost needless to say, leave the corresponding section of Form 1 blank.

FORM 4.—STRAYS AT TWILIGHT.*

Detailed Instructions.

WEATHER TABLES.

C refers to the kind of cloud visible. Enter

Cirrus or *Curl cloud* is light, fleecy, high cloud ("mackerel sky," "mares' tails," etc.) ... ... *a*

Cumulus is massy, woolly cloud in rounded shapes ... ... *b*

Stratus is layered cloud ... ... *c*

Nimbus is low, dark cloud from which rain is falling ... ... *d*

or two of these letters.

F refers to the fraction of the sky covered by cloud ... ... *0 to 10*

If no cloud enter 0, if sky wholly covered enter 10.

B.Q. indicates the brightest quarter ... ... *1* to *8*

NE=1, E=2, SE=3, S=4, SW=5, W=6, NW=7, N=8.

W wind; *d* and *f* refer to its direction and force (information from bridge).

Express direction by numerals as for B.Q. ... ... *1 to 8*

Express force of wind by the following scale:—

	Miles per hour.		Miles per hour.	
0 Calm	(Less than 1)	7 Moderate gale	(32 to 38)	*0* to *12*
1 Light air	(1 to 3)	8 Fresh gale	(39 ,, 46)	
2 Light breeze	(4 ,, 7)	9 Strong gale	(47 ,, 54)	
3 Gentle breeze	(8 ,, 12)	10 Whole gale	(55 ,, 63)	
4 Moderate breeze	(13 ,, 18)	11 Storm	(64 ,, 75)	
5 Fresh breeze	(19 ,, 24)	12 Hurricane	above 75	
6 Strong breeze	(25 ,, 31)			

(The numbers refer to the mean velocity, not to the velocity of gusts.)

* The observer's clock or watch should be set so that the minute hand is on a division when the seconds hand reaches 60. It need not be set to read Greenwich or any particular time.

	Enter
B refers to barometric height. State height, and whether the barometer has risen or fallen since last entry in ship's log	*Height* and *r* or *f*
T refers to the thermometer. State temperatures of air and sea, and whether they have risen or fallen since last entry in log	*Temperature* and *r* or *f*
P State whether there is rain = *r*, snow = *s*, hail = *h*, fog = *f*, lightning = *l*, thunder = *t*, dry weather = *d*, auroral display = *a*. Capital letters will mean great intensity—*e.g.*, R = heavy rain	*Small letter* or *Capital*.

SCALE OF SIGNAL STRENGTH. Enter

1, 2, 3, 4 } Weak	5, 6, 7, 8 } Medium	9, 10, 11, 12 } Strong	*1* to *12*

GRAPHIC RECORDS.—STRAYS AT TWILIGHT.

Before beginning these observations decide upon some convenient wave-length and note the precise adjustments of the receiving apparatus when tuned to receive that wave-length.

Enter the calculated time of sunset (or sunrise) and adjust the antenna and secondary to the standard wave-length; enter the wave-length. During the minute preceding the moment of starting the graphic record, enter the hour and minute of the start, as read on your clock or watch. Proceed with the record when the seconds hand reaches 60. If Time Signals are used for checking the clock or watch, the readings of the clock or watch will be entered at the times of the signals; if the ship's chronometer or a standard clock is used, a reading of the clock or watch, and the simultaneous reading oi the chronometer (preferably at the end of a minute on the chronometer) should be entered in the spaces following the words "preceding" and "following," instead of the Time Signal entries.

The G.M.T. of the start, the position, the weather chart, etc., may be filled up just before or just after the observations.

GRAPHIC RECORDS **Form 4.**

STRAYS AT TWILIGHT.

Day of Week...... Name of Station or Ship and Line
Signature of Observer......
Date...
Start observing about 15 minutes before time of change and continue till 15 minutes after.
State time on our clock or watch of.....................Time Signal preceding (.........hr..........m..........s.) and following (.........hr..........m..........s.) this observation. Wave length to which apparatus is set............metres.
Calculate { G.M.T.. of Sun rise............ / set .... Observer's Long..........Lat..........
Time of start as read on your clock or watch...........

Weather.	
C. & F....	....
B.Q.	....
W.: d......	....
f......	....
B.*........	....
T.* { air.	....
sea.	....
P............	....

Rising or falling.

0 1 2 3 4 5

5 6 7 8 9 10

10 11 12 13 14 15

15 16 17 18 19 20

20 21 22 23 24 25

25 26 27 28 29 30

The Committee has been fortunate enough to gain already very extensive support for their scheme of collecting statistics. Government Departments, Wireless Telegraph Companies, the staffs of Universities and Colleges, and amateur experimenters have generously arranged to help. The following Government Departments may be mentioned.: The British Navy, which will collect statistics in the China Seas, in the Western Pacific, in the Indian Ocean, and in parts of the Atlantic; the British Post Office in the British Islands; the Wireless Telegraph Departments of Canada, Australia, New Zealand, the Union of South Africa, and of several Crown Colonies; and the Telegraphen Versuchsamt in Berlin; and the U.S. Army Signal Corps. Besides these Government stations, the English, American and Canadian Marconi Companies have arranged for picked operators on certain lines of steamships and at some fixed stations to take a most important share in the work, while valuable data are expected from the Federal Wireless Company of America and the Anglo-French Wireless Telegraph Company. Among Universities and Colleges are several German, American, Austrian, and British institutions—great reliance will be placed on data received from these highly skilled observers. Finally, about thirty British amateurs have generously volunteered to place some of their leisure time at the service of the Committee. Later, it is intended to find means of giving proper public acknowledgment to all these private collaborators.

USEFUL FORMULAE AND EQUATIONS

We present here for the convenience of our readers a number of formulae and equations useful in radiotelegraphy, collected from various places. Those marked with an asterisk (*) have been taken by special permission of the Author and Publisher from Dr. J. A. Fleming's well known treatise on "The Principles of Electric Wave Telegraphy and Telephony," published by Longmans, Green & Co., of 39 Paternoster Row, London, E.C.

HEADING	FORMULA	REMARKS
1. Sine wave . . . . (Alternating current or undamped oscillation).	$i = I \text{ Sin } 2\pi n t$ Frequency $= n = \dfrac{\text{Revs. per min.} \times \text{number of poles}}{120}$	Gives instantaneous value i of current at time t secs in terms of max. value of current I, t, and the frequency n (number of complete cycles per second).
2. Impedance . . . . In circuit having Inductance and Resistance only.	Impedance $= \dfrac{\text{Volts}}{\text{Amperes}}$	
	Impedance $= \sqrt{4\pi^2 n^2 L^2 + R^2}$ $= \sqrt{L^2 p^2 + R^2}$ $= \sqrt{\text{Reactance}^2 + \text{Resistance}^2}$	Where L is Inductance in henrys and R is Resistance in ohms. Where $p = 2\pi n$.
	Impedance $= Lp$	If Resistance is negligible.
3. Impedance . . . . In circuit having Capacity and Resistance only.	Impedance $= \sqrt{R^2 + \left(\dfrac{1}{Cp}\right)^2}$	Where $p = 2\pi n$ as before and C is Capacity in farads.
4. Impedance . . . . In circuit having Capacity only.	Impedance $= \dfrac{1}{Cp}$	If Resistance R is negligible.
	so $I = \dfrac{E}{\dfrac{1}{Cp}} = ECp$	Where I is max. value of current, and E the applied P.D. in volts.
	$= 6{\cdot}28nEC$	For $p = 2\pi n = 6{\cdot}28n$.
	Therefore Root-mean-square current $= 4{\cdot}4nEC$	Because for sinusoidal currents R.M.S. current / max. current $= 1/\sqrt{2} = {\cdot}707$

In circuit having Inductance, Capacity & Resistance.	Impedance $= \sqrt{\left(Lp - \frac{1}{Cp}\right)^2 + R^2}$ $= \sqrt{(\text{Reactance} - \text{Captance})^2 + \text{Resistance}^2}$	
6. Angle of Lag and Power Factor.	$\tan\theta = \frac{\text{Reactance}}{\text{Resistance}}$ $\text{Cos}\theta = \frac{\text{Resistance}}{\text{Impedance}}$ $=$ Power Factor	Where θ is angle of lag of current behind applied P.D.
7. Resonance	Condition for Resonance $Lp = 1/Cp$ whence $n = 1/2\pi\sqrt{CL}$ and $T = 2\pi\sqrt{CL}$	Then Impedance reduces to Resistance only. Where T is time in secs. of a complete oscillation.
	$T = 2\pi\sqrt{I/K}$	Compare the general formula for Simple Harmonic Motion, namely Where I is moment of inertia and K is the ratio of the torque to produce displacement θ to θ.
8. Oscillatory Discharge .	Condition for Oscillatory discharge R must not be greater than $\sqrt{4L/C}$	If R is nearly as great as $\sqrt{4L/C}$, n becomes smaller than the value given by formula 7.
9. Velocity of Propagation and Wave Length . . .	Velocity of electro-magnetic waves $V = 186{,}000$ miles per sec., approximately. $= 300{,}000{,}000$ metres per sec. „ $= 3 \times 10^{10}$ cms. per sec. „	
	$V = n\lambda$	General formula connecting frequency, wave length and velocity.

HEADING	FORMULA	REMARKS
elocity of Propagation and Wave Length—*cont.*	From (7) which is Lord Kelvin's formula we see that $n = 1/2\pi\sqrt{CL}$	Where n is the number of complete oscillations per sec.
	and therefore from (9) $\lambda = \text{Vel. of Light } /n$ $= 3 \times 10^8 \times 2\pi\sqrt{CL}$ metres	Where C and L are in absolute units. But the absolute elec. mag. unit of capacity $= 10^9$ farads. or 10^{15} mfds. And the absolute unit of Inductance $= 10^{-9}$ henrys, or 10^{-3} mhys.
	Hence $\lambda = 3 \times 10^8 \times 2\pi\sqrt{CL/10^{12}}$ $= 1885\sqrt{CL}$ metres, approx. $= 6182\sqrt{CL}$ feet. and also, using the same units.	Where C and L are mfds. and mhys. respectively.
10. Frequency	$n = 160{,}000/\sqrt{CL}$ approx.	Complete oscillations per sec.
11. Electro-static and Electro-magnetic Units . .	Ratio of $\dfrac{\text{electromagnetic unit}}{\text{electrostatic unit}}$ of Quantity is equal to v; of Current " " v; of Resistance " " $1/v$; of Potential " " $1/v$; of Capacity " " v^2; of Inductance " " $1/v^2$	Where v is the velocity of light and equals 3×10^{10} (cms. per sec.)

... for steady values, small for instantaneous values.	I, i	Current	Ampère	10^{-1}	
	E, V	Electromotive Force	Volt	10^{8}	
	L	Inductance	Henry	10^{9}	1 cm. of Inductance is the electromagnetic unit and 1 microhenry $=1{,}000$ cms.
The new international symbols are given in the table on p. 662	C	Capacity	Farad	10^{-9}	1 cm. of Capacity is the electrostatic unit, and its connection to the farad and microfarad is given by tables (11) and (12).
	R, r	Resistance	Ohm	10^{9}	
	P	Power	Watt	10^{7}	
	W, J	Work or Energy	Joule	10^{7}	
	Q	Quantity	Coulomb	10^{-1}	

13. Damped Oscillations.

* $$L = I\epsilon^{-\alpha t}\,\text{Sin}\, 2\pi n' t$$

General equation (compare with 1)
ϵ is base of Napierian logs
α is a constant and is called the "damping factor."

14. Damping of non-radiative non-coupled circuit

* $$I_1/I_2 = I_2/I_3 = \ldots = \epsilon^{\frac{\alpha T}{2}}$$
* and $$\alpha T/2 = \alpha/2n = R'/4nL$$

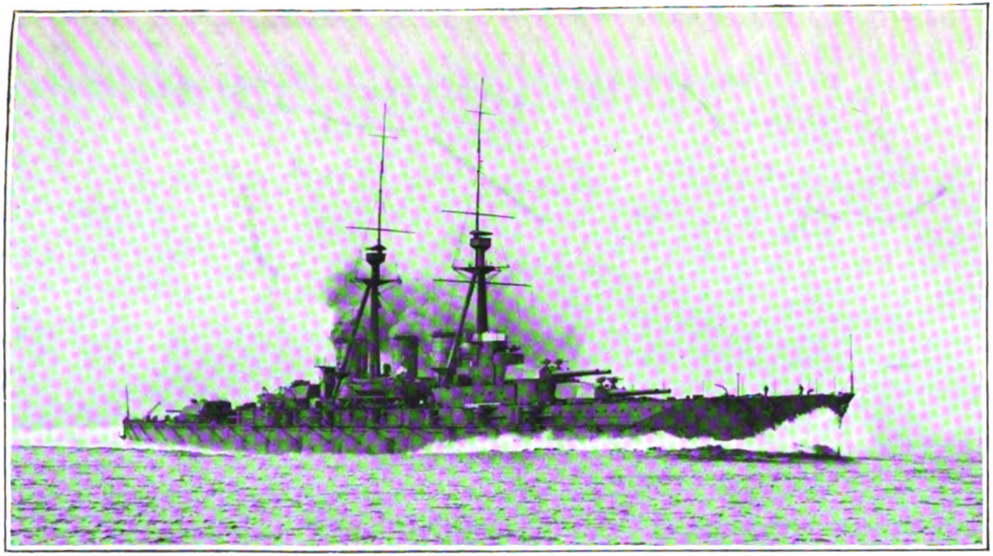
$$= \delta \ldots$$

Where R' is the high-frequency resistance.
The logarithmic decrement per half-period. R^1 in ohms, L in henrys or both in absolute.

* so $$\epsilon^{\delta} = I_1/I_2 = I_2/I_3 \ldots$$
* and $$\delta = \log_\epsilon I_1/I_2 = \log_\epsilon I_2/I_3 \ldots$$
* $$I_1/I_m = \epsilon^{(m-1)\delta}$$

Where I_1 is the first max. of current, I_m is the m^{th} max.

HEADING	FORMULA	REMARKS.
14. Damping of non-radiative non-coupled circuit—*cont.*	If we suppose the oscillations to be extinguished when $I_1/I_m=100$, i.e., when the last is only 1% of the first,	
Number of Oscillations in Train.	* $m=\frac{4{\cdot}605+\delta}{\delta}$	Giving the number of half-oscillations before max. value is reduced to 1% of its initial value. So the number of complete oscillations constituting the wave-train for practical purposes $=m/2$.
Two coupled circuits, each with damping.	* $\delta_1+\delta_2=\pi\left(1-\frac{n_2}{n_1}\right)\frac{J}{\sqrt{J_r^2-J^2}}$	Where the frequencies of the two circuits are n_1 and n_2 (nearly the same) gradually brought nearer so that finally $n_1=n_2$ giving resonance; and J is the R.M S. value of secondary current, increasing to J_r with resonance.
Determination of decrements.	* If a resonance curve be plotted, with a hot-wire ammeter in the secondary circuit, in which the ordinates represent the values of J^2/J_r^2 and the abscissae the fraction n_2/n_1 this gives us a curve with a max. ordinate equal to unity and a corresponding abscissa also equal to unity. Then if y is an ordinate very near to the maximum, and if $x=1-n_2/n_1$ $\delta_1+\delta_2=\pi x\sqrt{\frac{y}{1-y}}$	
15. High frequency Resistance	* $\frac{R^1}{R}=1+\frac{k^2}{48}-\frac{k^4}{2880}+\ldots$	Where R is resistance of the wire (straight cylindrical) for constant currents, and R^1 is res. of



The Japanese Battle Cruiser "Kongo," which has been fitted with a Marconi Installation.

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	$\frac{R^1}{R}=\frac{1}{2}\sqrt{k}$ If the wire is non-magnetic $\mu=1$ * If the wire is of copper, at ordinary temperatures, $\rho=1640$	... in c.g.s. electro-magnetic units. n is frequency. μ is magnetic permeability of material.
16. Mean Square Value .	Mean-square value (integral value) of oscillations having N trains or groups of oscillations per second is * $J^2=\frac{NI^2_e\delta}{8n}$ *	Provided δ (the decrement) is not greater than say $\pi/10$.
17. Coupling	* $k^2=\frac{M^2}{L_1L_2}$	Where k is the coefficient of coupling, M is the mutual inductance of primary and secondary, L_1 and L_2 are the self-inductances of primary and secondary.
	* $T_1=T\sqrt{1+k}$ $T_2=T\sqrt{1-k}$ * $n_1=\frac{n}{\sqrt{1+k}}$ * $n_2=\frac{n}{\sqrt{1-k}}$ * $\lambda_1=\lambda\sqrt{1+k}$ $\lambda_2=\lambda\sqrt{1-k}$ * and $k=\frac{\lambda_1^2-\lambda_2^2}{\lambda_1^2+\lambda_2^2}$	Where T, n, λ are the time-period, frequency and wave-length of each circuit separately, and T_1, T_2, n_1, n_2, and λ_1, λ_2 are the corresponding values of the two resultant waves produced by coupling.

HEADING	FORMULA	REMARKS
18. Capacity . . . . . Sphere in space, radius r cms.	$C=r$ cms.	Electrostatic units.
	$=\frac{r}{9\times10^5}$ from (11 and (12)	Microfarads.
Cylindrical condenser. (air dielectric)	C per unit length $\frac{1}{2\log\ b/a}$	Where b and a are outer and inner radii. Applies approximately to jars.
Parallel plates. (air dielectric)	$C=\frac{A}{4\pi d}$	Electrostatic units, d being distance apart in cms., small in comparison with length and breadth of plates, and A = surface in sq. cms.
	Parallel plate air condenser, 1 cm. spacing, C per sq. metre . . about ·00088 mfd.	
Long Wire.	$C=\frac{l}{2\log_e 2l/d}$	In space; l is length in cms. d is diam. in cms. Add about 10% for nearness to earth.
Banks of Condensers.	$R=\sqrt{MC/j}$ and $M=Rr$	Where R is rows of jars in parallel. r is " " series. M is total number of jars. C is Capacity required. j is Capacity of each jar.
19. Energy in Condensers	$J=\frac{1}{2}QV$ But $Q=CV$ So $J=\frac{1}{2}CV^2$	Where Q is number of coulombs. C is capacity in farads. V is voltage to which it is charged.

... wire, one turn, in form of square. In form of circle.	* $L = 2l\ (2{\cdot}303 \log_{10} 4l/d - 2{\cdot}45)$	l is length in cms. d is diam. in cms. Absolute units. Strictly, this is for infinite frequencies, but it is sufficiently accurate for ordinary wireless frequencies.
Solenoid, single layer.	$L = 4\pi^2 n^2 \left(\frac{2a^4 + a^2 l^2}{\sqrt{4a^2 + l^2}} - \frac{8a^3}{3\pi} \right)$ (*Cohen*)	Absolute units, where a is mean radius, n is number of turns per cm. length, l is length in cms.
Single wire, straight.	* $L = 2l\left(2{\cdot}303 \log_{10} \frac{4l}{d} - 1\right)$	Absolute, l is length in cms. d is diam. in cms.
21. Energy stored in Inductance	$J = \frac{1}{2} L I^2$	L is Inductance in henrys. I is amperes flowing. J is number of Joules stored.
22. Horse-Power . . .	Indicated Horse-power $= \frac{plan}{33{,}000}$ 1 H.P. = 33,000 ft. lbs. per min. = 550 „ per sec. 1 H.P. = 746 watts. 1 Kilowatt = 1000 Watts = 10^{10} ergs per sec. = 737·3 ft. lbs. per sec. = 1·32 H.P.	Where p is mean effective pressure per sq. inch (from indicator diagram). a is area of piston in sq. ins. l is length of stroke in feet. n is number of working strokes per minute.

HEADING	FORMULA	REMARKS
22. Horse Power—*cont.*	A good horse walking $2\frac{1}{2}$ miles per hour exerts for 10 hours a tractive force of 100 lbs., equivalent to 22,000 ft. lbs. per minute. For 5 hours a tractive force of 200 lbs., equivalent to 44,000 ft. lbs. per minute. A man hauling along a level road at $1\frac{1}{2}$ to 3 miles per hour is reckoned at $\frac{1}{6}$ of a H.P. for a 10-hour day; i.e., he does 3,670 ft. lbs. per minute for a 10 hour day. Turning a handle, he does 2,600 ft. lbs. per minute for a 10-hour day.	Thus a H.P. is more than he can do for 10 hours.
Safe H.P. for Shafting.	Diam. of Shaft in inches $= 3{\cdot}69\sqrt[3]{\dfrac{\text{H.P. transmitted}}{\text{Revs. of shaft per min.}}}$	
23. Magnets	Magneto-motive force $= 4\pi nC$ $= 4\pi nC/10$ $\dfrac{\text{Magneto-motive force}}{\text{flux}} = \text{Reluctance}$ $= \dfrac{\text{length}}{\text{area} \times \text{permeability}}$	in cgs. units, C being the current. If current is in amps.
Tractive force of Permanent magnet.	$p = a\sqrt[3]{w^2}$	p is weight in kilograms which magnet will carry, w is weight of magnet in kilograms, a varies (for steel of good quality) from 18 to 23.
Length of Wire on Bobbin.	$L = 21820\frac{l}{\delta^2}(D^2 - d^2)$ yards	Where D is diam. of bobbin in inches l is length ,, ,, ,, (inside) d is diam. of core in inches δ is diam. of wire in mils

	ohms, to fill the bobbin so as to give a resistance r^1 we must use a wire of diameter d^1 where $d^1 = d\sqrt[4]{r/r^1}$	gauge used should be rather smaller than that given by formula, and vice-versa.
24. Rope, Strength of—	Rough rule for all Cordage except Coir:— Safe Working Load = c^2 cwts. where c = circumference in inches. For wire ropes (hemp core). Working load = $9c^2$ cwts. For best quality steel rope with wire core this may be increased considerably. One authority gives for such ropes: Working load = $16c^2$ cwts.	This may be increased, for good cordage in good condition, up to a maximum of $2c^2$ cwts.
Elongation of Stays.		
All-wire rope	Elongation $0{\cdot}25 \times S/c^2$ %	Where S = load in tons. c = circumference in inches.
Wire rope with one main hemp core.	” $0{\cdot}3 \times S/c^2$ %	
Wire rope with main hemp core, and hemp core in each strand.	” $0{\cdot}5 \times S/c^2$ %	Thus, if the value comes out to 0·05 %, this means that 100 feet will stretch 1/20 of a foot, owing to the tightening-up of the wires composing the rope.
Weight of Wire Rope.	Weight in lbs. per fathom = square of circumference in inches.	Thus 4″ wire rope would weigh about 16 lbs. per fathom.
Miscellaneous	1 Inch = 2·54 cms. 1 cm. = ·3937 inch. 1 Foot = ·3048 metre 1 metre = 3·28 feet. 1 Mile = 1·61 kilometre 1 kilometre = ·62 mile. 1 Mile per hour = 1·466 feet per sec.	

HEADING	FORMULA	REMARKS
Miscellaneous—*contd.*	1 Grain = ·065 gram. 1 Ounce = 28·35 gram. 1 Kilogm. = 2·204 lbs. (2⅕ lbs.) 1 Litre = 1·76 pints = 61 cubic inches. 1 Lb. per sq. inch = 2·31 feet water = 2·04 ins. Mercur. 1 Atmosphere = 14·7 lbs. per sq. inch. 1 Cubic foot water weighs 62·35 lbs. (1,000 oz.) 1 Gallon (Imperial) weighs 10 lbs. so 1 Cubic foot contains about 6 gallons. 1 Cubic yard of concrete weighs about 30 cwt. and 18 cubic feet „ „ „ one ton. 1 Radian = 57·29° ϵ = (base of Napierian Logs) = 2·7183. Common Log × 2·3026 = Napierian Log.	
Strength of Materials.	WORKING STRESS.	

	In Tension.	Compression.	Shear.	
Mild or Structural Steel.	6	6	3·7	Tons per sq. in.
Oregon Fir	1,200	1,200 with grain		Lbs. per sq. in.
		300 across grain		„ „
Red Pine	900	800 with grain		„ „
		200 across grain		„ „

GLOSSARY OF TERMS

AERIAL.—The part of a radiotelegraphic station which is arranged so as to be closely linked with the aether in the neighbourhood of the station; the part, therefore, which is used (in conjunction with the "earth"—q.v.) to transfer the energy of the transmitter to the aether, or—in the case of a receiving aerial—to collect the energy from the aether for use in the receiver. In its usual form it consists of a wire, or system of wires, one end of which is insulated at a certain height above the ground, and the other connected through certain apparatus to earth, or to a "balancing capacity to earth." It is also spoken of as the "Antenna."

AERIAL CIRCUIT.—Starts at the free or insulated end of the aerial and ends with the connection to earth or to the balancing capacity, including all coils and condensers which may interpose, provided that these form part of the direct path for the oscillations from aerial to earth.

AETHER.—The imponderable, elastic, all-pervading medium which cannot be detected by any of our senses, but which is supposed to exist because the Undulatory Theory of Light and of Electro-magnetic Waves (q.v.), based on that supposition, gives a good working hypothesis by which to explain a large number of important phenomena, not only fitting in well with known facts, but even leading to the discovery of new ones.

AUTO-JIGGER.—See Direct Coupling.

ALTERNATING CURRENT.—A current which periodically changes its direction of flow.

ALTERNATOR.—A generator of alternating current.

AMPLITUDE.—Alternating or oscillating currents are generally represented graphically by a wavy line about a horizontal axis. This axis generally represents Time, while the vertical axis represents the value of the current; so that the instantaneous value of the current at any moment can be found by drawing a vertical line from the point on the horizontal axis corresponding to the particular moment to meet the curve; the length of this line representing the value of the current at that moment. The amplitude of such a wave is the length of such a line drawn when the current is at a maximum or minimum—*i.e.*, drawn to a crest or to a trough of the wave. It measures, as it were, the amount of the maximum displacement from the zero line, and is thus an indication of the *strength* of that particular wave.

Antenna.—See Aerial.

Aperiodic.—That which has no definite period of its own. An aperiodic receiver would be one which was ready to respond to all waves, whatever their period might be.

Arrester, Earth.—A small piece of apparatus in the form of a spark-gap presenting a very large sparking-surface and a very short air-gap; largely used by the Marconi Company in their ship stations and elsewhere. It is placed in series with the earth-lead of the transmitter, and from the side of the spark-gap remote from earth a lead is taken to the receiving apparatus. For received signals the short spark-gap acts as a complete break in the circuit, so that the signals travel along the lead to the receiver; whereas, the moment the transmitting key is pressed, the aerial current breaks down the air-gap, which then acts as a short circuit to earth, but is restored to an insulating condition the moment that transmission ceases. This contrivance, besides doing away with all necessity for an aerial change-over switch, enables the operator to keep the telephones on his head while transmitting, so that the other operator can call his attention if he wishes to ask a question. For this purpose telephone short-circuiting contacts (q.v.) are fitted to the transmitting key. The earth-arrester also fulfils another useful function in keeping the aerial always practically earthed for thunderstorms, etc.

Automatic Transmission and Reception.—(1) *Transmission.*—In this system the actual manipulation of the signalling key, by which the electric waves are sent out in dots and dashes spelling out the message according to the Morse Code, is done by mechanism instead of by the hand of the operator. This elimination of the personal element not only ensures a perfect *regularity* of speed and "spacing," but also allows an enormously *greater* speed to be attained.

(2) *Reception.*—Automatic transmission enables a speed to be attained which is far too high for the human brain to follow and record. To take full advantage, therefore, of automatic transmission, an automatic recorder is necessary. The original "coherer receiver" was an automatic recorder when used in conjunction with a Morse Inker; but it was not suited to high-speed working. The present-day automatic recorder will work up to several hundred words a minute.

Atmospherics.—Disturbances produced in the receiving circuits, more or less resembling actual signals, caused by electrical action in the atmosphere or in the earth's crust.

Battery.—A collection of elements, or units. Thus a simple Voltaic cell would consist of a positive and a negative element in an electrolyte, and a collection of such cells would form an electric battery. Similarly a Leyden jar is a condenser, and a collection of jars would form a battery of condensers.

Blower, Motor.—A piece of machinery usually in the form of a rotary fan driven by a continuous-current motor, for drawing in air at atmospheric pressure and delivering it in the form of a high-pressure blast. Used for preventing the formation of an arc.

Bradfield Insulator.—A long ebonite insulator strengthened by a metal core and provided with an asbestos-packed gland. Widely used by the Marconi Co. for leading-in the aerial to the interior of the building; capable of withstanding the high potentials of transmission, and entirely water-tight.

Brush.—A conducting piece for making electrical connection to a moving part by frictional sliding.

Bus Bar.—This is a single, large lead or connection common to a large number of pieces of apparatus. In W it denotes more particularly the broad common lead on to which the smaller individual leads from the various units of a condenser battery (q.v.) are joined.

Buzzer.—A small piece of apparatus used for the production of feeble oscillations for the purposes of test, etc. It resembles, in one of its forms, the mechanism of an electric bell with the gong and hammer absent.

Buzzer, "Tuned" or "Shunted."—An ordinary buzzer, with the coils of the electro-magnet shunted by a non-inductive resistance.

Buzzer, Practice.—A combination of a buzzer and a signalling key, arranged in a convenient form on a common base, for the purpose of practising Morse signalling.

Call-Bell.—An arrangement by which incoming signals, and especially signals of distress, may call the attention of the operator even if he is off duty.

Capacity.—The property by which a condenser (q.v.) stores up electrical energy. It is measured by the number of coulombs (quantity of electricity) the condenser will hold when the difference of pressure between the two extreme plates is one volt.

In conjunction with inductance (q.v.), capacity forms an important factor in the production of oscillations.

The effect of capacity on an alternating current is to send on the current in advance of the electromotive force.

Characteristic Curve.—A curve (which may be a straight line) usually drawn with reference to two axes at right angles, showing the variation of a property of a material or of a piece of apparatus when submitted to a gradually increasing influence which produces that variation.

Choking Coil.—A coil of wire wound in such a way as to have great self-induction (q.v.).

Choking Coil, Air-Core Protecting.—A choking coil without any iron core, especially designed to protect the transformer-secondary from high-frequency currents from the oscillating circuits. One such coil is generally put in each lead connecting the transformer to the H.F. condenser. Being without any iron core, these coils have practically no effect on the low-frequency current from the transformer to the condenser, but exert a powerful choking effect on any oscillations which may try to reach the transformer.

Circuit, Closed Oscillating.—A circuit of such a nature that oscillations are possible in it, and so constituted that there is no distinct break of continuity. A spark-gap in series would form such a break, but when once the spark-gap is broken down by a discharge the circuit becomes a closed one. A condenser need not form such a break of continuity, provided its terminal plates are not too far apart; but a condenser in which the plates are very remote—such as the capacity formed by the wire of an aerial as one plate, and the earth as the other—is considered to convert the circuit into an open oscillating circuit.

Circuit, Open or Radiating Oscillating.—See above.

Coherer.—An imperfect contact or collection of such contacts, so arranged that when brought under the influence of the incoming electro-magnetic wave it coheres and allows current from a local battery to pass and make some kind of signal.

COMPASS, WIRELESS.—A name given to the Marconi-Bellini-Tosi direction-finder, by which the bearings of a station whose signals are being received can be found by turning a handle over a marked scale. Another type of apparatus is known as the Telefunken Compass.

COMMUTATOR.—An arrangement of moving or movable contacts by means of which the direction or path of the current in a system can be changed. Thus in a direct-current dynamo the C changes the alternating current produced in the armature coils into direct current in the leads from the brushes of the commutator; in the induction coil the C reverses the direction of flow of the primary current; in a condenser C the path of the current is changed so as to flow through the condensers either in series or in parallel, or in some combination of the two.

COMMUTATOR, SWISS.—A particular form of commutator by which a condenser battery can be arranged in various forms of series-parallel connection.

CONDENSER.—A condenser unit is a system composed of two conducting surfaces placed close together and separated by an insulator, which is called the dielectric. If these two conductors are connected to the terminals of any generator of electricity, positive electricity flows into one of the surfaces and negative into the other. These charges of electricity affect each other through the dielectric, which is put into a state of stress; and the flow continues until this stress exactly balances the pressure applied by the generator. The condenser is then said to be fully charged. For a given impressed voltage or pressure the amount of electricity which must flow before this condition is reached varies with the size of the plates, the distance between them, and with the nature of the dielectric. All these factors, combined into one, form what is known as the capacity of the condenser (q.v.).

CONDENSER, AIR.—A condenser in which the dielectric is air.

CONVERTER.—A machine having an armature with commutator and slip-rings revolving in a magnetic field; serving to transform alternating current into continuous or (as is more usual in Wireless) *vice versâ*.

COUPLING.—Is the ratio of the mutual induction between two circuits compared with the square root of the product of the self-inductance of each circuit. The coefficient of coupling of two such circuits is given by $k = M / \sqrt{L_1 L_2}$. In a coupled-circuit transmitter it is the coupling

which governs the interaction of primary and secondary, and the consequent formation of two waves of different wave-length, given by the formulæ $(\lambda_{1 \text{ and } 2})^2 = \lambda^2(1 \pm \kappa)$, where λ is the wave-length of each circuit taken separately, and λ_1 and λ_2 are the two wave-lengths produced by the interaction.

Coupling, Percentage of.—The fraction representing the coefficient of coupling can be put into the form of a percentage by multiplying by 100.

Crystal Detector.—A form of oscillation detector depending on the fact that certain crystals (*e.g., carborundum*) allow current to pass through them more readily in one direction than in the other; so that they exert a rectifying effect on a train of oscillations, converting the latter into a train of intermittent pulses in one direction, which can be stored up in a condenser or made to agitate the diaphragm of a telephone.

Cut-Out.—A safety arrangement fulfilling the same function as a fuse (q.v.), but not acting by the fusing of a conductor. Usually a contact is broken by mechanical means as soon as the current reaches a certain value in an electromagnet which controls the release of the contact.

Cymometer.—A "wave-measurer." See Wave-meter.

Cymoscope.—A "wave-see-er." See Detector.

Damping.—The process of withdrawing energy from a system, which is moving rhythmically, in such a way as to reduce, little by little, the amount of its movements. Thus a pendulum set swinging freely in air would keep up its motion for a long time, but if the bob were made to pass through a viscous oil, energy would be taken from the pendulum to overcome the friction of the oil and the swings would rapidly become smaller and smaller, and finally be extinguished sooner than if swinging freely in case of air. Similarly if the pendulum is made to do work by driving some clock-work, the swings will rapidly die out unless the spring of the clock-work supplies enough fresh energy.

Damping Factor.—That part of the expression for the logarithmic decrement of an oscillation which is independent of the period of the oscillation (*vide* Decrement).

Decrement, Logarithmic.—A measure of the rate of dying down or decay of an electric oscillation under the influence of damping. The ratio of the max. amplitude of one swing to the max. amplitude of the swing following it is constant, whether

the swing be the first, second . . . or last but one; and the Napierian logarithm (q.v.) of this ratio is called the Logarithmic Decrement of the oscillation. Its value depends on the inductance, resistance, etc., in the oscillating circuit, and also on the period of the oscillation.

The general practice is to consider the ratio of one maximum to the maximum following to it, but certain investigators take the ratio of one max. to the next max. *in the same direction.* The decrement per whole period thus obtained is double that of the usual decrement per half-period.

Decremeter.—A piece of apparatus for measuring the logarithmic decrement of an oscillation. The Marconi Decremeter can also be used to measure wave-lengths, capacities, inductances and couplings.

Detector.—An instrument which shows the presence of minute currents, etc. In W, that part of the receiving apparatus which converts the received electromagnetic waves into a form of energy which can be noted visually or by the ear. Most detectors depend on their rectifying (q.v.) action on a train of oscillations, for the rectified current will actuate a telephone receiver or a relay.

Dielectric.—A medium such as glass, ebonite or air through which electrical energy can be transmitted, not by conduction—as in the case of metals—nor by electrolysis—as in the case of conducting liquids—but by an electrical strain in the medium. Particularly applied to such a medium in connection with condensers (q.v.).

Dielectric Constant.—See Specific Inductive Capacity.

Dielectric Strength.—The property in virtue of which a dielectric is able to stand a powerful electric stress without rupture. It is measured by the pressure (in volts or some other unit) which a thickness of 1 cm. of the dielectric will stand without breaking down.

Diffraction.—The bending of a ray of waves from its normal path in a straight line, on passing "round a corner" (*i.e.,* on passing an opaque obstacle which intercepts part of the ray). The amount of diffraction depends on the wave-length, so that in light, for instance, a spectrum can be obtained by diffraction just as it can be by refraction through a prism; but the relation of the amount of diffraction to the wave-length is exactly opposite to the relation in the case of refraction (q.v.), for with

refraction the longer the wave the less is it bent, while in diffraction the greater the wave-length the more the bending.

Direct Coupling.—When one circuit is linked to another in such a way that a portion of one circuit forms part of the other, or in such a way that there is direct electrical connection between the second circuit and a point in the first, then these circuits are said to be direct-coupled. An example of the first condition is provided in the auto-jigger (*vide* Jigger), in which the inductance of the primary circuit is formed of a certain number of turns of the secondary circuit. An example of the second case is where a lead is taken off from a point in the aerial circuit (q.v.) to the detector circuit—as is sometimes done in the case, for instance, of a crystal or valve detector.

Discharger.—That piece of apparatus in the primary oscillating circuit at which the spark or arc, as the case may be, takes place.

Disc Discharger.—A piece of apparatus used by the Marconi Co. for the production of regular trains of slightly-damped waves, giving a clear musical note in the receiving telephones.

Duplex Telegraphy.—A system by which each one of a pair of stations can send a message to, and receive a message from, the other station at the same time.

Earth Connection, or "Earths."—The connection to the upper crust of the earth which in most systems forms the lower extremity of the aerial system (q.v.). Usually takes the form of a system of metal plates or wires, or a combination of both, more or less deeply buried in the ground near the station.

Efficiency.—A measure of the merits of a piece of apparatus or of a system, with regard to producing the desired effects with minimum expenditure of energy or work.

Most machines and systems are concerned with the transformation of energy of one kind into energy of another kind, and there is always a certain amount of loss in the actual process of transformation. Whatever be the forms of the energy before and after the transformation, they can always be reduced to equivalent values of foot-pounds and their amounts compared; so that the efficiency is measured by the ratio of energy put in to the energy taken out. It is clear that the fewer losses there are in the process of transformation the greater will be the efficiency.

Electrolysis.—The separation of the intermingled "ions" existing in certain solutions of salts or fused salts, by

the action of an electric current, these ions moving in opposite directions through the liquid until they meet with the solid conductors which lead the current in to and out from the liquid. To these solid conductors (the "Electrodes") the ions give up their respective charges, with the result that the current appears to be conducted through the liquid (the "Electrolyte") just as if the path had been a metal one; but with attendant chemical changes which are absent in metallic conduction.

ELECTROMAGNETIC THEORY OF LIGHT AND ELECTRIC WAVES.—See Undulatory Theory.

ETHER.—See Aether.

FREQUENCY.—A term used in connection with any form of rhythmical motion or rhythmical change, denoting the number of complete movements or changes in a given time—usually a second.

FREQUENCY, HIGH AND LOW.—The term low frequency was originally applied to alternating currents produced by machines, of the order of from 25 to perhaps 1,000 periods per sec., while the term high frequency was reserved for those very rapid currents produced by the discharge of a condenser, and used in radiotelegraphy, medical electricity, and elsewhere; such frequencies being of the order of millions per sec. Now, however, with the development of long-distance radiotelegraphy, frequencies as low as 20 or 30 thousand periods per sec. are being produced by condenser-discharge, while, on the other hand, alternating-current machines have been designed to give similar high frequencies. The line of demarcation, therefore, between high and low frequencies has become less definite, but in general a frequency measured in tens or hundreds of periods per sec. may be called a low frequency, while one measured in thousands or millions per sec. may be called a high frequency.

FUNDAMENTAL.—The fundamental note, swing, or oscillation of a system capable of rhythmical motion or change is the one which fits in with the formula giving the time-period of the system in terms of those of its properties which affect that period. Thus in an electrical oscillating circuit the time-period is fixed by the amount of inductance, capacity, and resistance in the circuit, and the fundamental wave of such a circuit would be a wave of that time-period.

Such a circuit, however, is capable of resonance to certain other waves, called "Harmonics," whose frequencies bear a certain definite relation to that of the fundamental.

Thus in radiotelegraphy the first harmonic of an aerial has a frequency three times as great as that of the fundamental; the second harmonic, five times as great, and so on.

FUSE.—A short piece of conducting material, usually in the form of a wire or strip of metal with a low fusing-point, introduced in series with an electric circuit. If the current in this circuit rises for any reason above a certain safe value, the conductor melts and thus breaks the circuit, preventing the excessive current from doing damage to the apparatus. *Vide* "Cut-Out."

GALVANOMETER.—An instrument for indicating and measuring an electric current (usually of small magnitude).

GALVANOMETER, STRING OR EINTHOVEN.—An exceedingly sensitive galvanometer, suitable for indicating received signals in wireless, in which the moving-part is a fine stretched conducting string.

HARMONIC.—See Fundamental.

HARMONIC CURVE.—See Sine-wave.

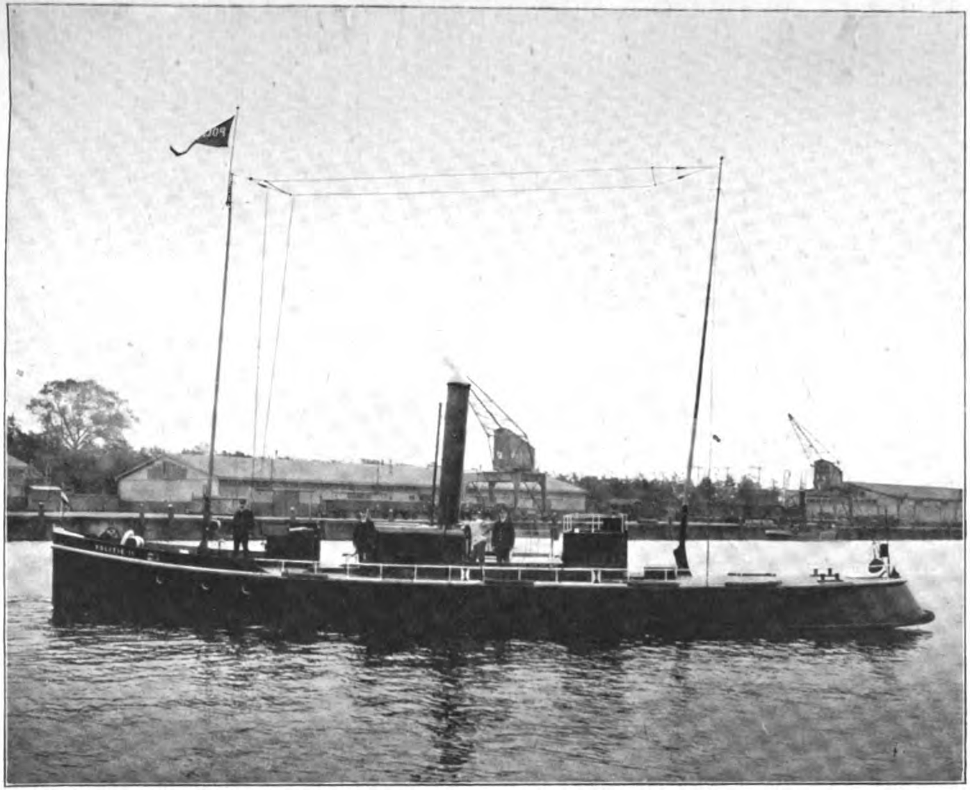
HIGH-FREQUENCY ALTERNATOR.—See Frequency, High and Low.

HIGH-FREQUENCY RESISTANCE.—The resistance offered by conductors to the passage of high-frequency currents. Owing to the fact that such currents confine themselves to the skin of the conductor, a much smaller amount of material is provided for the passage of the current than would be the case for a continuous current, which distributes itself uniformly throughout the whole cross-section of the conductor, or for a low-frequency current, in which distribution is not uniform but equivalent to leaving only a small central portion inactive. The high-frequency resistance of a conductor is therefore considerably greater than its ordinary resistance.

HYSTERESIS.—A "lagging-behind"—the lagging of an effect behind the cause producing it; generally due to friction of some kind, molecular or otherwise.

Particularly applied to the lagging of the magnetisation of a substance such as iron behind the magnetising force, by which the magnetising force may reach its maximum value some time before the resulting magnetisation reaches its maximum, and, on the other hand, the iron may still have some magnetism left when the force producing it has been reduced to zero.

Similarly, the stress in the dielectric (q.v.) of a condenser (q.v.) lags behind the changes of electrical pressure producing the stress. In both these cases, if the cycle of change is repeated many times



The Rotterdam Police Boat, "Politie II.," fitted with Marconi Wireless Apparatus.

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per second, the molecular friction producing the hysteresis results in the production of heat.

Inductance.—The property of an electric circuit, by virtue of which it stores up energy in the form of a magnetic field round it.

Inductance is thus comparable with inertia in mechanics, which stores up energy in kinetic form in moving bodies.

The effect of inductance on an alternating current is to cause the current to lag behind the electromotive force.

In conjunction with capacity (q.v.) inductance forms an important factor in the production of oscillations.

Inductance (concrete sense).—A circuit, or part of a circuit, designed so as to have considerable inductance, and made use of for that property, is known as an inductance coil, or an inductance.

Induction Coil.—A piece of apparatus which makes use of the phenomena of induction to transform continuous current of comparatively low voltage to an intermittent current of high voltage.

Inductive Coupling.—When two circuits are linked together in such a way that there is no direct electrical connection between them as in the case of direct coupling (q.v.), the only linking being provided by the mutual induction between the circuits, they are said to be inductively coupled.

Interference.—The inter-action of two waves of different frequencies, or of two waves of the same frequency but different phase, acting in the same circuit; resulting in the formation of points called "Nodes" where the resultant energy is zero, and "Antinodes," or "Loops," where it is at a maximum. This phenomenon is particularly obvious in acoustics, and can be demonstrated beautifully in light; but it is also of great importance in radiotelegraphy. See also Loop.

Interference (in reception).—The introduction of undesired signals, either from other stations or from atmospheric discharges, into a receiver which is engaged in the reception of a message.

Interrupter.—An arrangement for breaking up a continuous current into a succession, more or less rapid, of pulses. Used particularly in connection with the induction coil (q.v.). Has various forms, of which the commonest is the hammer-break, in which the current itself provides (through its magnetising powers) the force required for working the interrupter; the electrolytic interrupter, in which the current interrupts itself by forming and

breaking-down, in rapid succession, globules of insulating gas at a finely pointed electrode (see Electrolysis); and the mercury, or turbine, interrupter, driven by an electric motor, in which the path of the current along a jet of mercury is constantly being cut through by a rotating toothed plate.

Ionisation.—See Electrolysis. In a liquid which conducts electricity, some at least of the molecules are normally split up into their constituent "ions" and there is a constant interchange of partners going on between the ions of one molecule and their neighbours. When, therefore, an electromotive force is applied, tending to force a current through the electrolyte, none of this force has to be applied in order to break up the molecules into their ions. However small, therefore, this force may be, it will always have ions at its disposal to carry the current, though the magnitude of the current will depend, of course, on the magnitude of the E.M.F. applied. So the smallest difference of potential will always force a small current through an electrolyte; and an electrolyte is in a permanent state of "ionisation." When, however, we have to deal with conditions through a gas, the conditions are different. A gas, like a liquid, can only conduct through the medium of ions, and in gas under ordinary conditions—air, for instance, in a spark-gap before a discharge—there is practically no ionisation. Air under such conditions behaves, therefore, as an insulator, and the potential difference has to reach a very high value before the molecules break up into ions and allow the spark to pass. The current, passing in the form of a spark, produces a great amount of "ionisation," and the resistance of the gap becomes quite low.

Jigger.—A special form of potential transformer designed for high-frequency (oscillating) currents.

Jigger, Transmitting.—The oscillation transformer used in the transmitting apparatus for transferring the energy of the primary circuit to the aerial circuit. The comparatively low potential of the primary current is transformed to a potential which increases up the aerial and reaches a very high value at the free insulated end of the latter.

Jigger, Receiving.—The oscillation transformer used in the receiving apparatus for transferring the energy collected by the aerial circuit to the detector circuit.

Key, Manipulating Key, Operating Key.—The instrument which, worked by the hand of the operator, causes the transmitter to send out signals in the form of the Morse Code.

KEY, HIGH-TENSION TRANSMITTING.—An arrangement by which the transmitting circuit is made and broken by a switch in the high-tension leads of the transformer, controlled by the ordinary manipulating-key. Usually the primary current is made and broken for signalling purposes, but on large stations, where the primary current is too large to control by a key with ease and rapidity, the H-T key is employed, since the high-tension currents are smaller.

LAMP, TUNING.—A small, low-voltage incandescent-filament lamp arranged so that it can take a small fraction of the oscillating current induced in the earth-lead of the transmitter. The amount of glow produced in this lamp when the transmitter is in action is an indication of the total current in the earth-lead, and as this depends on the accuracy of syntonisation between the primary and secondary the lamp can be used for the purpose of tuning these circuits; for if both an increase and a decrease in the wave-length of the aerial circuit produce a less brilliant glow the two circuits must be in tune.

LEYDEN JAR.—A modification of the original form of the first condenser (q.v.) ever discovered. Still used sometimes on account of its simplicity and strength. It consists of a glass jar with its bottom and part of its sides covered inside and outside with tin-foil, connection with the inside foil being made by a rod passing through the stopper and spreading out in the interior of the jar in the form of wire springs which press against the tin-foil.

LOOP OF POTENTIAL (ALSO CALLED ANTI-NODE OF POTENTIAL).—A point of maximum potential in a circuit or portion of a circuit along which the potential is gradually rising or falling. When an oscillation travels up an aerial, it is reflected back from the free insulated end, and the reflected wave, interfering with the original wave (see Interference) produces what is called a stationary wave in the aerial. This results in a production of different values of potential at different points along the aerial circuit, the value of the potential increasing and decreasing in the form of a wave-curve along the circuit. If the circuit is vibrating to its fundamental (q.v.), the potential starts with a zero value at the earth connection and increases all the way along the aerial till it reaches a maximum at the free end. If it is vibrating to a harmonic, there will be one or more points along the aerial circuit where the potential is zero. These points, together with the zero point at earth, are called the nodes of potential, and their antitheses, the points of maximum potential, are called the anti-nodes

or loops of potential. Whether the aerial circuit is vibrating to its fundamental or to a harmonic, if it is vibrating freely it will always have a node of potential at the earth and an anti-node or loop at the free end. A node of potential is also an anti-node of current, and *vice versâ*.

MAGNETIC DETECTOR, MARCONI'S.—A detector (q.v.) of oscillations depending on the effect of these on the hysteresis (q.v.) of soft iron.

MAGNETIC KEY, GRAY'S.—An instrument used in conjunction with the ordinary key (q.v.) to facilitate the use of the latter when dealing with fairly large alternating currents. The contacts of the magnetic key short-circuit those of the hand key directly this is pressed, and only break the short-circuit when the alternating current is passing through its zero value. Hence the damage which might be done to the contacts owing to arcing is avoided.

MAST, STEEL SECTIONAL.—A type of mast built up of hollow steel sections of semi-circular shape, after a system which enables it to be erected to great heights, such as 450 ft., without the use of any kind of scaffolding.

MICROPHONE.—A sound-magnifier, by which very faint sounds, such as those produced by a fly's feet, can be rendered audible, or by which comparatively loud sounds—such as those of a person speaking into a telephone—can be made to produce greater effects than would otherwise be the case.

MICROMETER SPARK-GAP.—A term given in radiotelegraphy to a small, delicately adjustable spark-gap, used as a protecting device for receivers, etc., to protect them against atmospheric discharges and other undesired influences. Somewhat similar in action to the earth-arrester (q.v. under Arrester).

MORSE INKER.—An apparatus for recording the short and long signals of the Morse Code in the form of short and long ink-marks made by an inked wheel on a travelling strip of paper.

MULTIPLE TRANSMISSION AND RECEPTION.—A system by which one station can send two or more messages simultaneously to two or more other stations, or receive similarly from them. In conjunction with duplex (q.v.) it enables a station to receive messages from two or more stations, while at the same time sending messages to them.

NAPIERIAN LOGARITHMS.—A scientific system of logarithms to the base ϵ, whose value is 2·7183 approx. Also called Hyperbolic or Natural Logarithms, in contra-distinction to the Logs to base 10, which are termed Common or Brigg Logs.

NODE.—See Loop.

NON-INDUCTIVE SHUNT.—A shunt (*i.e.*, an alternative path) of such a nature as to possess little or no inductance. Often made by doubling an insulated wire into a loop, and treating the double wire thus formed as one wire, which is then wound into a small coil beginning at the looped end.

NOTE TUNING.—Syntonisation of the receiver to the frequency of the wave-trains instead of to the frequency of the waves themselves. The rapidity with which one train follows the other determines the note of the sound produced in the receiver, which may by various methods be made sensitive to one particular note in preference to others.

OSCILLATIONS, ELECTRIC.—Alternating currents of high frequency (q.v.) such as are produced by the discharge of a condenser through a circuit whose resistance does not exceed a certain value in comparison with the inductance and capacity.

OSCILLATION VALVE (FLEMING).—A small incandescent electric lamp with filament of carbon or tungsten having a metal plate or cylinder sealed into the bulb carried on a third terminal used to rectify oscillations and therefore valuable as a detector of electric waves. (See *Valve*.)

OSCILLATIONS, FREE AND FORCED.—An oscillation is said to be "free" when the circuit in which it takes place is suited to it, *i.e.*, when the oscillation has the same frequency, on its own account, as that of the fundamental (q.v.) or of one of the harmonics (q.v.) of the circuit. It is said to be "forced" when the circuit in which it takes place is not suited to it.

PERIOD.—The period of any system undergoing rhythmical change signifies one complete cycle of change, at the end of which the system is ready to start again on a cycle similar in nature and sense (or "direction").

PERIODIC TIME.—The time taken by one complete period.

PHASE.—An alternating or oscillating current, in performing a complete alternation or oscillation, passes through two complete series of changes, each of the two series being of the same nature (though not necessarily of the same magnitude), *but in the opposite sense*, or, as it is commonly spoken of, in the opposite direction. The phase of such a current at any moment of time denotes what part of the two series of changes has been reached by the current at that instant.

Plain Aerial.—An early form of transmitter in which the spark-gap producing the oscillations was placed directly in series with aerial and earth, so that the only condenser in which the energy of the transmitter could be stored was the capacity of the aerial to earth.

Similarly, the term is sometimes applied to the receiving circuit when the detector is placed directly in series with the receiving aerial and earth.

Potentiometer.—An instrument originally designed for the measurement of potential-difference, as its name implies; but capable of being applied to many other measurements and much used in connection with "Wireless" receivers to *regulate* the difference of potential between two points. Consists essentially of a high resistance put "in shunt" across a source of current, a sliding-contact being provided from which a lead can be taken off from any point along the potential gradient produced along the resistance.

Power.—The amount of work done in unit time.

Power, Apparent.—In an alternating electric circuit, this is the product Volts × Ampères.

Power, Real.—The product of the Volts into that component of the current whch is in phase with the voltage.

Power-factor.—The ratio of the real power (watts) to the apparent power (volt-ampères).

Protecting Devices.—Arrangements by which it is ensured that apparatus shall not have its insulation, etc., damaged, or its working interfered with, by undesired influences from other circuits or elsewhere. Examples of such influences are: atmospheric discharges and induced currents from the transmitter, in the case of receiving apparatus; the same induced currents, and oscillations conducted back from the high-frequency circuits, in the case of transmitting apparatus. See article on "The Marconi System" in this volume.

Quenched Spark.—A form of spark which, owing to the nature of its discharger, extinguishes itself rapidly after allowing a few oscillations to pass.

Quenched Spark System.—A system of transmission using a quenched spark in the primary circuit. The object aimed at is

that as soon as the primary circuit has given up all its energy to the aerial circuit, the spark becomes extinguished, so that there is no longer a closed-circuit primary to re-act on the secondary, thus producing two frequencies in the circuits.

Radiation.—The transference of energy, whether in the form of light or heat, or in that form which is utilised in wireless telegraphy, by electromagnetic waves through the æther. See Undulatory Theory.

Radiation Resistance.—The rate at which the oscillations set up in a circuit decrease and die away depends on the losses experienced by each oscillation. (See Damping and Decrement.) These losses are made up of losses due to the production of heat in the circuit, owing to the resistance of the latter, and losses due to the transference of energy to other circuits.

In the case of an aerial the losses are made up of the heat-losses in the aerial and earth—"joulean losses"—and the losses due to the radiation of energy in the form of ætheric waves. If the power of radiating were removed from the aerial, the decrease in damping caused by the removal of radiation losses could be made up for by adding more resistance to the aerial circuit, thus increasing the joulean losses.

The amount of resistance which would have to be added in order to bring up the total losses to their old value is clearly a measure of the radiating powers of the aerial, and is called the Radiation Resistance.

Rectifier.—An apparatus for converting alternating or oscillating currents into continuous current, or into pulses of unidirectional current.

Refraction.—A change in direction of a wave of any kind brought about by its entering a medium in which its velocity is different to the velocity in the medium which it is leaving. If the wave enters the second medium in a direction normal to the surface of demarcation between the two media, the direction of the wave is unchanged, but if it enters at an angle to the surface, it is bent or refracted either towards or away from the normal at the point of entry, according as the second medium gives a lower or higher velocity than the first—*e.g.*, a ray of light entering a glass prism.

RELAY.—An apparatus by means of which a current, too small to perform the required work, is made to turn on and off a larger current, which performs the work under the control of the small current.

RESONANCE.—The production of vibrations in a body or a circuit by the action of a periodic force which has the same period as the natural period of the body or circuit. Under these conditions, the series of impulses produced by the periodic force, following one another in regular succession, find themselves so "fitting in" with the effects produced by their predecessors that one impulse helps and strengthens the other.

See Fundamental, Period.

ROOM, OPERATING.—The room in a radiotelegraph station wherein the telegraphist or operator works in sending or receiving the messages.

ROOM, TRANSMITTING.—The room containing the actual transmitting apparatus, the operation of which is controlled from the operating room.

ROOT-MEAN-SQUARE VALUE.—R.M.S. value of an alternating or oscillating current is the value given by the square root of the mean of the squares of the successive values of the current throughout the half-period.

In a current of strict sine-wave shape (sinusoidal current) the R.M.S. value is equal to the maximum current multiplied by ·707. The R.M.S. current is also called the Effective Current.

The above also applies to the R.M.S. value of Potential.

RUHMKORFF COIL.—The name given to the original induction coil for the production of small currents of very high voltage from larger currents of low voltage. The ancestor of the "trembler" coil used for motor-car ignition purposes.

SELECTIVITY.—The property of a receiving apparatus by virtue of which it can select or pick out the waves from the station which it wants to "receive," to the exclusion of all other waves from other stations or from the atmosphere.

SELF-INDUCTION.—The term self-induction is identical in meaning with the term inductance (q.v.).

SHOCK-EXCITATION.—A name given to the method of exciting oscillations in the aerial circuit by a sudden and very short transference of energy from another circuit. See Quenched Spark.

SHUNT.—An alternative path for an electric current.

SINE-WAVE, SINUSOIDAL WAVE.—A wave of such a kind that the rhythmical changes which constitute it can be represented by a particular form of smooth curve known as a sine-curve; the characteristic of this being that the values represented by different points on the curve are always proportional to the sines of an angle which is increasing uniformly throughout the period and which is proportional to the times at which those points on the curve are reached. In other words, the ordinates of a sine-curve are proportional to the sines of an angle which is itself proportional to the corresponding abscissæ.

The sine-curve is also known as a Harmonic Curve.

The alternating current from certain alternators approaches very nearly to a perfect sine-wave; oscillating currents as a rule are not sinusoidal.

SKIN-EFFECT.—See High-frequency Resistance.

SPARK-MICROMETER.—A tool or instrument for the accurate determination of the length of a spark-gap. (c.f. and contrast Micrometer Spark-gap.)

SPECIFIC INDUCTIVE CAPACITY.—The S.I.C. of a medium is the ratio of the capacity of a condenser, having the medium as a dielectric, to the capacity of the same condenser with air as the dielectric.

STARTER, MOTOR-.—An arrangement of resistances and contacts for regulating the entry of current into the field- and armature-coils of a motor when starting up from rest; usually including also arrangements by which the current is cut off entirely when anything abnormal takes place in the circuit.

SYNTONY AND SYNTONISATION.—The adjustment of one circuit to another, or of one transmitter taken as a whole to one receiver taken as a whole, in such a way that the time-periods are the same throughout the system; so that waves possessing a time-period different to this will produce little or no effect on the system. (See Oscillations, Free and Forced; Resonance; Period, and Selectivity.)

TAPPER.—A small vibrating hammer used for restoring certain forms of coherer (q.v.) to a condition of non-conductivity on the cessation of signals.

TELEPHONE-SHORT-CIRCUITING-CONTACTS.—An arrangement of two small platinum contacts mounted on the same base as the manipulating key (q.v.) and so disposed that the action of pressing this key automatically closes these contacts. The contacts are connected directly across the leads to the telephone receiver, with the result that when the key is pressed in order to send out a signal from the transmitter they short-circuit the telephones a little before the actual key-contacts close and the signal is sent.

In conjunction with the arrester (q.v.) this arrangement enables the operator to keep the telephones on his head while in the act of transmitting, without experiencing the troublesome noises which would otherwise be induced in the telephones.

TELEPHONE TRANSFORMER.—A small transformer used in connection with a telephone of low resistance in conjunction with a high-resistance detector such as the valve or crystal (q.v.).

TELEPHONE CONDENSER.—A condenser, usually variable in three steps, placed in shunt across the telephone receiver. Suitable adjustment of this condenser improves the quality of the sound produced by the signal, rendering it more audible and more distinguishable from atmospherics.

TICKER.—A rapid make-and-break arrangement sometimes used in working with undamped waves, its object being to break up the effect of these waves into a series of impulses so as to give a note audible in the telephones.

TRAIN OF WAVES.—The group of oscillations sent out from the aerial at every discharge of the primary circuit. The number of waves in a train obviously depends on the decrement or rate of decay; while the number of trains per second determines the nature of the musical sound received by the ear—*i.e.*, the frequency or pitch of the note.

TRANSFORMER.—Usually refers to a potential transformer—*i.e.*, an apparatus for changing a current of electricity at one potential or voltage into a current at a different potential or voltage. A " step-up " T converts the current to a higher voltage, a " step-down " T to a lower voltage.

Transformers may take the form of a piece of machinery with a rotating armature, but the word is usually applied to the "static" transformer which has no moving part and which depends on the use of alternating current (q.v.). The induction coil is a form of static transformer which works with direct current split up mechanically into pulses of uni-directional current; or it can be used with alternating current by suppressing the interrupter (q.v.).

TREMBLER.—A particular form of interrupter (q.v.) resembling a hammer-break on a small scale, and largely used on small induction coils such as are employed for motor-ignition purposes.

TUNER, MULTIPLE.—A piece of apparatus brought out by the Marconi Co. and in general use at all their ship-stations and elsewhere. It is used in conjunction with the Magnetic Detector (q.v.) and, when thus combined, provides in a compact and convenient form a complete receiving apparatus, with all the requirements and niceties for accurate syntonisation and selectivity, together with the power of rendering the system non-selective at will, so as to be on the "look-out" for any possible signals.

TUNING.—See Syntony. Also see Note-Tuning.

TUNING, FLAT AND SHARP.—Tuning is said to be *sharp* when a small change of time-period in a circuit produces a marked effect on the strength of the currents which are being imposed on the circuit, and *flat* when this is not the case.

UNDAMPED WAVES.—A train of undamped waves is one in which the amplitude of each successive wave is equal to that of the wave preceding and following it. Such a train, therefore, has no tendency in itself to decay and die away, and its decrement is zero.

A truly undamped wave should have a pure sinusoidal form.

UNDULATORY THEORY, OF LIGHT AND OTHER RADIATION.—The theory which forms the basis of modern ideas with regard to light, heat, and electric phenomena.

In its original form, and applied to light, it was suggested in the seventeenth century by Huyghens, who maintained that light consisted of waves of some sort starting out from the luminous body. The whole of space was supposed to be filled with

an imponderable, unsubstantial substance, which nevertheless had to possess perfect elasticity; and the luminous body, by the vibrations of its atoms, was supposed to send out waves of vibration in all directions through this substance, one atom of which would hand on its vibration to the next, and so on. This idea, though it explained all the known phenomena of light, led to certain difficulties; for if the atoms of the luminiferous æther—as this all-pervading substance was termed—were actually set into motion by the waves, certain results would be produced which are contrary to known facts.

The theory as it stood was modified by Clerk Maxwell and extended by him to foreshadow the actual discovery of the waves now used in radiotelegraphy. According to his theory—known as the Electro-magnetic Theory of Light and Electric Waves—the vibrations consist not in the change in position of the æther particles, but in a periodic alteration of the electrical and magnetic condition of the æther.

The theory, thus modified, has none of the old objections, and it has been supported by every fresh discovery which has been made since it was adopted. It led, for instance, to the discovery by Hertz of the electric waves which were the small forerunners of those now used for Marconi telegraphy.

Summed up, the theory states that the æther conveys every kind of radiation *with the same speed* in the form of periodic electro-magnetic changes in the condition of the æther from point to point; that the kinds of radiation include light waves of every colour, radiant heat waves, the waves which affect the photographic plate, and the waves used in Marconi telegraphy, and that these different waves, through producing such diverse effects, only differ from one another in the time taken for a complete period.

The theory of electrons, more modern still, agrees with the older theory and defines more precisely what is meant by the electro-magnetic changes.

VALVE, VACUUM, OR FLEMING VALVE.—A form of detector depending on the fact that in an exhausted vessel the space between a glowing filament and a cool, insulated conducting surface near it will allow current to pass from the cool surface to the filament, but not in the reverse direction. That is to say, the filament is continually sending off negative electrons, which

will therefore serve to conduct electricity in the negative sense from the filament to the surface, but not *vice versâ*. As a result, such an arrangement can be used as a rectifier (q.v.) for received oscillations, and thus as a detector (q.v.).

VIRTUAL VALUE.—Same as Root-mean-square value (q.v.).

WAVES, WAVE-MOTION, WAVE THEORY.—See Undulatory Theory, etc.

WAVE-LENGTH.—The actual distance between any point in a wave and the corresponding point in the wave immediately following or preceding it, in the same train.

WAVE-METER.—An instrument for measuring the wave-length and frequency of an electro-magnetic wave.

X.—The name given to signals generated by atmospheric disturbances or changes in the earth's magnetic condition.

X-STOPPERS.—Arrangements for eliminating the effects of atmospheric disturbances on the receiving circuits.

DICTIONARY OF TECHNICAL TERMS

English.	French.	Italian.	Spanish.	German.
Accumulator batteries	Batterie d'accumulateurs	Batterie di accumulatori.	Acumuladores, Baterias de	Accumulatoren Batterie
Aerial, horizontal	Antenne horizontale	Antenna orizzontale	Antena horizontal	Horizontaler Luftleiter
Aerial, receiving	Antenne de réception	Antenna di ricezione	Antena de recepcion	Empfangsdraht
Aerial, "star"	Antenne en étoile	Antenna stellata	Antena en estrella	Sternformiger Luftleiter
Aerial, transmitting	Antenne d'émission	Antenna di trasmissione.	Antena de transmission	Geberdraht (Sendeluftleiter)
Aerial, umbrella	Antenne en parapluie	Antenna a forma di ombrella	Antena de paragua en forma	Schirmnetz
Alternator	Alternateur	Alternatore	Alternador	Wechselstromumformer
Ammeter, a.c.	Ampèremètre pour courant atternatif	Amperometro per corrente alternata	Amperimetro, c.a.	Wechselstromamperemeter
Ammeter, d.c.	Ampèremètre pour courant continu	Amperometro per corrente continua	Amperímetro, c.c.	Gleichstromamperemeter
Ammeter, hotwire	Ampèremètre à fil chaud.	Amperometro a filo caldo	Amperímetro térmico	Hitzdrahtamperemeter
Ammeter, moving coil	Ampèremètre d'Arsonval	Amperometro a bobina mobile	Amperímetro de bobina movil	D'Arsonvalscher Amperemeter
Antenna.	Antenne	Antenna	Antena.	Luftleiter (Antenne)
Antenna, horizontal extension of	Branche horizontale de l'antenne	Fili orizzontali dell' antenna	Antena, Prolongación horizontal de la	Horizontale Verlangerungsdrahte des Luftleiters
Antenna, T-shaped	Antenne en T.	Antenna a forma di T.	Antena en forma de T.	T. formige Antenne
Antenna, extended T-shaped	Antenne en T. à branches horizontales prolongées	Antenna a forma di T. allungata	Antena en forma de T. prolongada	Verlängerte T. Luftleiter
Apparatus, receiving	Appareils de réception	Apparecchi di ricezione	Aparatos receptores	Empfanger
Apparatus, transmitting	Appareils de transmission	Apparecchi di trasmissione	Aparatos transmisores	Sender
Arrester, earth terminal	Eclateur de mise à terre	Morsetto par presa di terra	Estallador de toma de tierra	Unterbrochener Erdanschlusz
Arrester, lightning	Parafoudre	Dispositivo scaricafulmine	Pararrayos	Blitzschutz
Atmospherics	Perturbations atmosphériques	Perturbazioni atmosferiche	Perturbaciones Atmosféricas	Luftstoerungen
Battery of Leyden jars	Batterie de bouteilles de Leyde	Batteria di bottiglie di Leida	Bateria de Botellas de Leyden	Batterie Leydener Flaschen
Bell, call-	Sonnerie d'appel	Campanello di chiamata.	Timbre de Llamada	Lockklingel
Blower, electric motor	Soufflerie à moteur électrique	Ventilatore ad azionamento elettrico	Motor soplador or Ventilador eléctrico	Geblaese mit Elektrischen Antrieb
[illegible]	[illegible] omnibus princi-	Barre collettrici principali	Barras colectoras princi-	Haupt Sammelschienen

[illegible]	[illegible]	[illegible]	Capacidad	Aufnahmefähigkeit
Cart, radiotelegraph	Voiture radiotélégraphique	Carro radiotelegrafico	Carro de radiotelegrafía	Funkenkarren
Change of connections for receiving	Commutation pour la réception	Commutazione per ricezione	Cambio de conexiones para la recepción	Umschaltung auf Empfangen
Change of connections for transmitting	Commutation pour la transmission	Commutazione per trasmissione	Cambio de conexiones para la transmisión	Umschaltung auf Senden
Chokes, air core protecting	Bobine de réactance sans noyau de fer	Bobine di protezione a nucleo d'aria	Bobinas de reactancia, protectoras, de núcleo de aire	Impedanzspulen fur hohe Frequenz mit Luftkern
Choking coil	Bobine d'impédance	Rocchetto d'autoinduzione	Bobina de reactancia	Drosselspule
Circuit breaker and closer	Disjoncteur et conjoncteur Automatique	Interruttore	Interruptor con apertura y cierre automáticos	Strom-unterbrecher Strom-schliesser
Circuit, closed oscillating	Circuit oscillant fermé	Circuito oscillante chiuso	Circuito oscilante cerrado	Geschlossener Erregerkreis
Circuit, intermediate	Circuit intermédiaire	Circuito intermedio	Circuito intermedio	Zwischenkreis
Circuit, open radiating	Circuit radiant ouvert	Circuito radiante aperto	Circuito radiador abierto	Offener Strahlungskreis
Circuit, oscillatory	Circuit oscillatoire	Circuito oscillante	Circuito oscilante	Schwingungskreis
Circuit, oscillating transmitting	Circuit oscillant d'émission	Circuito oscillante trasmittate	Circuito oscilante transmisor	Sender Erregerkreis
Coherer	Cohereur	Ricevitore a coherer	Cohesor	Fritterempfänger
Coil, syntonising	Inductance de syntonisation	Rocchetto di sintonizzazione	Bobina de sintonización	Abstimmspule
Commutator	Commutateur	Commutatore	Conmutador	Stromwender
Commutator (of Dynamo)	Collecteur	Collettore	Colector	Stromwender
Condensers	Condensateurs	Condensatori	Condensadores	Kondensatoren
Condenser, adjustable	Condensateur règlable	Condensatore regolabile	Condensador variable	Variabler Kondensator
Condenser, adjustable disc	Condensateur à disque	Condensatore a disco regolabile	Condensador de disco, variable	Drehkondensator
Condenser, aerial tuning	Condensateur de syntonisation d'antenne	Condensatore per la sintonizzazione dell' antenna	Condensador de sintonización de la antena	Kondensator zur Luftleiterabstimmung
Condenser, air	Condensateur à air	Condensatore ad aria	Condensador de dialéctrico de aire	Luftkondensator
Condenser, calibration	Condensateur étalon	Condensatore per tarature	Condensador para calibración	Eichungskondensator
Condenser, circuit	Circuit du condensateur	Circuito del condensatore	Condensador, Circuito de	Kondensatorkreis
Condenser, intermediate circuit	Condensateur du circuit intermédiaire	Condensatore per il circuito intermedio	Condensador del circuito intermedio	Kondensator im zwischenkreis
Condenser, secondary circuit	Condensateur du circuit secondaire	Condensatore per il circuito secondario	Condensador del circuito secundario	Kondensator im secundärkreis
Condenser, short wave	Condensateur de raccourcissement	Condensatore per onda corta	Condensador de onda corta	Verkürzungskondensator
Condenser-system	Système de condensateur	Sistema di condensatori	Sistema de Condensadores	Kondensatorsystem

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Condensers, test-tube	Condensateurs à tube	Condensatori tubolari	Tubo para erisayo de condensadores	Kondensator Prüfröhre
Condensers, variable	Condensateurs réglables	Condensatori variabili	Condensadores variables	Variablerkondensatoren
Converter	Commutatrice	vertitore	Convertidor	Drehumformer
Coupling	Couplage	Accoppiamento	Acoplamiento	Kopplung
Couplings, flexible and insulating	Manchons d'accouplement souples et isolants	Accopiamenti elastici ed isolanti	Acoplamientos flexibles y aisladores	Biegsame und isolierende verbindungen
Current, alternating	Courant alternatif	Corrente alternata	Corriente alterna	Wechselstrom
Current, direct	Courant continu	Corrente continua	Corriente contínua	Gleichstrom
Current, primary alternating	Courant alternatif primaire	Corrente alternata del circuito primario	Corriente alterna primaria	Primär Wechselstrom
Current, secondary alternating	Courant alternatif secondaire	Corrente alternata del circuito secondario	Corriente alterna secundaria	Sekundär-Wechselstrom
Cut-out, automatic	Interrupteur automatique	Interruttore automatico	Interruptor automático	Selbstunterbrecher
Cymometers	Cymomètres	Cimometri	Cimómetro	Wellenmesser
Damper	Sourdine	Sordina	Amortiguador	Dämpfer
Damping, high	Amortissement élevé	Forte smorzamento	Amortiguamiento, Gran	Grosse Dämpfung
Decremeter	Décrémètre	Decrimetro	Decrémetro	Dekremeter (Dampfungsmesser)
Detector, contact	Détecteur à contact	Rivelatore di onde a contatti	Detector de contacto	Kontaktdetektor
Detector, crystal	Détecteur à cristal	Rivelatore di onde a cristallo	Detector de cristal	Krystalldetektor
Detector, Fleming valve	Récepteur à valve d'oscillation " Fleming "	Rivelatore di onde con valvola di Fleming	Detector de Válvula, Fleming	Prof. Fleming's Valve-Empfänger
Detector, magnetic	Détecteur magnétique	Rivelatore di onde magnetico	Detector magnético	Marconi-Magnetdetektor
Detector, mineral	Détecteur à mineral	Rivelatore di onde a sostanze minerali	Detector mineral	Mineraldetektor
Detector, recording	Détecteur enregistreur	Rivelatore di onde registratore	Detector registrador	Registrierende Detektor
Detector, thermo-electric	Détecteur thermo-éléctrique	Rivelatore di onde termoelettrico	Detector termoeléctrico	Thermo-elektrischer detektor
Detector, wave	Détecteur d'ondes	Rivelatore di onde	Detector de ondas	Wellenanzeiger
Dielectric strength	Rigidité diélectrique	Rigidità dielettrica	Resistencia dieléctrica	Dielektrische Festigkeit
Discharger, disc, high speed	Eclateur à disque à grande-vitesse	Scaricatore a disco ad alta velocitá	Descargador de disco de gran velocidad	Schnell rotierende Scheibenfunkenstrecke
Discharger, disc, smooth	[illegible] à disque uni	Scaricatore a disco a con-[illegible]	Estallador de disco liso	Rotierende Scheibenfunkenstrecke-glatt
[illegible]	[illegible]	[illegible]	Estallador de disco denti-[illegible]	Rotierende [illegible]

		...uzione di scintilla micrometrica	micrometrica	
Duplex telegraphy	Télégraphe duplex	Telegrafia duplex	Telegrafía duplex	Duplex Telegraphie
Earth connection	Connexion de terre	Messa a terra	Conexión de tierra	Erd Verbindung
Efficiency	Rendement	Rendimento	Rendimiento	Wirkungsgrad
Energy	Energie	Energia	Energía	Energie
Frequency, high	Haute fréquence	Alta frequenza	Frecuencia, alta.	Hochfrequenz
Frequency, low	Basse fréquence	Bassa frequenza	Frecuencia, baja	Niedfrequenz
Frequency meter	Fréquencemètre	Frequenziometro	Frecuencímetro	Frequenzmesser
Fuse	Fusible.	Fusibile	Fusible.	Schmelzeinsatz
Generating plant	Générateur	Impianto generatore	Instalación generadora	Stromanlage
Generator, d.c.	Dynamo	Generatore di corrente continua	Generador de corriente contínua	Dynamo (Gleichstrom)
Hammer-break, magnetic.	Interrupteur à marteau	Interruttore magnetico a martello	Interruptor magnético de martillo	Magnetischer Hammerunterbrecher
Ignition	Allumage	Accensione	Ignición *or* Encendido	Zuender (Zuendung)
Ignition apparatus	Appareils d'allumage	Apparecchio di accensione	Aparatos de ignición	Zuendungsvörrichtung
Ignition coil	Bobine d'allumage.	Rocchetto di accensione	Bobina de ignición.	Zuenderspule
Inductance, aerial	Inductance d'antenne	Induttanza dell' antenna	Inductancia de antena	Antenneninduktanz
Inductance, aerial tuning.	Inductance à syntoniser le circuit de l'antenne	Induttanza per la sintonizzazione dell' antenna	Inductancia de sintonización de la antena	Induktanz zum Syntonisieren der Antenne
Inductance, low frequency	Bobine d'inductance du circuit à basse fréquence	Induttanza per il circuito a bassa frequenza	Inductancia del circuito de baja frequencia	Induktanzspule niedriger frequenz
Inductance, primary	Inductance primaire	Induttanza per circuito primario	Inductancia primaria	Primärinduktanz
Inductance coil	Bobine d'Inductance	Induttanza a rocchetto	Bobina de inductancia	Funkeninduktor
Inductance, primary syntonising	Inductance primaire de syntonisation	Induttanza sintonizzatrice del circuito primario	Inductancia primaria de sintonización	Primärinduktanz zum abstimmen
Inductance, syntonising	Inductance de sintonisation	Induttanza sintonizzatrice	Inductancia sintonizadora	Abstimminduktanz
Inductance, variable primary syntonising	Inductance primaire variable de syntonisation	Induttanza, sintonizzatrice del circuito primario, regolabile	Inductancia variable de sintonización del primario	Veränderliche Primärinduktance zum Abstimmen
Induction coil.	Bobine d'Induction	Rocchetto d'induzione	Bobina de inducción	Rhumkorffscher Funkeninduktor
Inkwriter, Morse	Appareil Morse enregistreur	Ricevitore scrivente Morse	Aparto Morse registrador	Schreibempfänger
Insulation	Isolation	Isolamento	Aislamiento	Isolierung
Insulator, flexible	Isolateur souple	Isolatore, elastico	Aislador flexible	Flexibler Isolator
Insulator, receiving	Isolateur de réception	Isolatore dell' antenna di recezione	Aislador para circuito receptor	Isolator fur den Empfangsdraht
Insulator, transmitting	Isolateur de transmission	Isolatore dell' antenna di transmissione	Aislador para circuito transmisor	Isolator fur die Senderantenne
Interrupter	Rupteur	Interruttore	Interruptor	Unterbrecher
Interrupter, current-	Rupteur de courant	Interruttore di corrente	Interruptor de corriente	Stromunterbrecher

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Interrupter, electrolytic	Rupteur électrolytique	Interruttore elettrolitico	Interruptor electrolítico	Wehnelt Unterbrecher
Interrupter, turbine	Turbo-rupteur à mercure	Interruttore a turbina	Interruptor de turbina	Quecksilberturbine-nunterbrecher
Jigger	Transformateur d'oscillations	Transformatore delle correnti oscillatorie	"Jigger"	Jigger, Selbst-induktion des erregerkreises
Jigger, primary	Primaire de transformateur d'oscillation	Circuito primario del transformatore delle correnti oscillatorie	"Jigger," primario del	Primär-Jigger
Jigger, secondary	Secondaire de transformateur d'oscillation	Circuito secondario del transformatore delle correnti oscillatore	"Jigger," secundario del	Sekundär-Jigger
Jiggers, with heaped windings	Transformateurs d'oscillation à enroulements superposés	Transformatori delle correnti oscillatorie con avvolgimenti a fascio	"Jiggers" con arrollamiento sobrepuestos	Jiggers mit übereinandergelagerten windungen
Key-sending	Manipulateur	Tasto manipolatore di trasmissione	Manipulador	Taste
Leyden jar	Bouteille de Leyde.	Bottiglia di Leida	Botella de Leyden	Leydener Flasche
Leyden jar, battery of	Batterie de bouteilles de Leyde	Batteria di bottiglie di Leida	Botellas de Leyden, Bateria de	Batterie Leydener Flaschen
Lamp, tuning—and choke	Lampe de sintonisation avec bobine de réactance	Lampada di sintonizzazione con bobina	Lámpara de sintonización y de reactancia	Syntonisierlampe mit Impedanz
Lightning arrester	Parafoudre	Dispositivo scaricafulmine	Pararrayos	Blitzschutz
Mast, portable	Mât, portatif.	Albero, portatile	Mástil, portátil	Tragbarer Mast
Masts, steel sectional	Mâts d'acier à sections	Albero di acciaio diviso in sezioni	Mástil de secciones de acero	Stahlmasten in Teilen
Mast, telescopic	Mât, télescopique	Albero telescopico	Mástil telescópico	Teleskopmast
Microphone apparatus	Appareil microphone	Apparecchio microfonico.	Aparato microfónico	Microphon-Apparat
Micrometer, spark	Micromètre à étincelle	Micrometro per Scintilla.	Micrometro de chispa	Funkenmikrometer
Morse Inkwriter. *See* Inkwriter, Morse	—	—	—	—
Motor alternator disc set	Groupe moteur alternateur avec éclateur à disque	Gruppo convertitore con scaricatore a disco	Grupo de motor, alternador con estallador de disco	Wechselstromgenerator kombiniert mit Rotierende Funkenstrecke
Multiple transmission and reception	Transmission et réception multiples	Transmission e Ricezione multipla	Transmisión y recepción múltiple	Vielfach ubermittlung und empfang
Oscillations, electric	Oscillations électriques	Oscillazioni elettriche	Oscilaciones eléctricas	Elektrische-Schwingungen
Overload	Surcharge	Sovraccarica.	Sobrecarga	Überlast
Plaut, radiotelegraphic	Installation radiotélégraphique	Impianto radiotelegrafico	Instalación radiotelegráfica	Radiotelegraphische Anlage
[illegible]	Plot de [illegible]	[illegible] circuito	[illegible] para corto [illegible]	[illegible] topeel
Rectifiers	Rectificateurs	Raddrizzatori di corrente	Rectificador	[illegible]
Relay H.T.	Relais pour haute tension	Soccorritore ad alta tensione	Relevador A.T.	Ausgleicher Hochspannungrelais
Relay magnets	Aimants du relais	Magneti di soccorritore	Imanes del relevador	Relais-magnete
Resistance, high	Haute résistance	Alta resistenza	Resistencia, alta	Hoher Widerstand
Resistance, low	Basse résistance	Bassa resistenza	Resistencia, baja	Niedriger Widerstand
Resistance, starting	Rhéostat de démarrage	Reostato di avviamento	Reostato de arranque	[illegible]
Resistance regulating	Rhéostat de champ	[illegible]	[illegible]	[illegible]

		...metro	Potenciometro	Potentiometer
Power	Puissance	Potenza	Capacidad	Leistung
Range	Portée	Portata	Alcance	Reichweite
Receiver	Appareil récepteur	Apparecchio ricevitore	Receptor	Empfänger
Receiver arrangement	Dispositif de réception	Dispositivo di ricezione	Dispositivo de recepcion	Empfangsvorrichtung
Receiver, flexible	Récepteur souple	Ricevitore flessibile	Receptor flexible	Empfänger
Receiver, vacuum valve	Récepteur à valve d'oscillation	Ricevitore con valvola a vuoto	Receptor de válvula de vacio	Vakuum ventil Empfänger
Rectifiers	Rectificateurs	Raddrizzatori di corrente	Rectificador	Ausgleicher
Relay H.T.	Relais pour haute tension	Soccorritore ad alta tensione	Relevador A.T.	Hochspannungrelais
Relay magnets	Aimants du relais	Magneti di soccorritore	Imanes del relevador	Relais-magnete
Resistance, high	Haute résistance	Alta resistenza	Resistencia, alta	Hoher Widerstand
Resistance, low	Basse résistance	Bassa resistenza	Resistencia, baja	Niedriger Widerstand
Resistance, starting	Rhéostat de démarrage	Reostato di avviamento	Reostato de arranque	Anlasser
Resistance regulating	Rhéostat de champ	—	Resistencia de regulación	Regulierwiderstand
Room, accumulator (battery)	Salle des accumulateurs	Stanza per la batteria di accumulatori	Sala de acumuladores (Batería)	Akkumulatorenraum
Room, engine	Salle des machines.	Locale delle macchine	Sala de máquinas	Maschinenraum
Room engineers	Bureau de l'ingénieur	Ufficio dell' ingegnere	Despacho del Ingeniero	Ingenieur's Bureau
Room, landline	Bureau du service télégraphique	Ufficio telegrafico	Sala del servicio telegrafico	Land Linie Tel. Zimmer
Room, operating	Salle de manipulation et réception	Ufficio radiotelegrafico	Sala telegráfica	Bedienungszimmer fur die Drahtloseinstallation
Room, transmitting.	Chambre des appareils de transmission	Locale di trasmissione	Sala de manipulacion	Senderraum
Saddles, pack	Selles de paquetage	Basti	Bastes	Packsattel
Screening box.	Boîte de garde	Cassetta di protezione	Caja de resguardo	Schutzkasten
Sensitive tube.	Tube sensible	Tubo sensibile	Tubo sensitivo	Empfindliche Roehre
Series rheostat	Rhéostat en serie	Reostato in serie	Reostato en serie	Serien Widerstand
Ship station	Station de bord	Stazione navale	Estación de á bordo	Schiffstation
Short circuiting device	Dispositif de mise en court circuit	Dispositivo di messa in corto circuito	Dispositivo de corto circuito	Kurzschliesser
Shelves for condenser spares	Etagère pour matériel de rechange pour condensateur	Scansie per parti di rispetto dei condensatori	Estantes para repuestos del condensador	Bretter fur Reserveteile der Kondensatoren
Shunt, highly inductive	Shunt à pouvoir inductif élevé	Shunt ad alta induzione.	Shunt altamente inductivo	Shunt mit hohe selbstinduktion
Signals, balancing	—	Segnali equilibrati	Señales compensadores	Balanciersignale
Signals, telephone	Signaux téléphoniques	Segnali del telefono	Señales telefónicas	Telephonsignale
Single spark gap	Eclateur simple	Oscillatore simplice	Estallador sencillo de chispa	Einzelfunkenstrecke
Span	Haubanage	Campata	Tirante.	Abspannung
Spark	Etincelle	Scintilla	Chispa	Funke
Spark coil, with hammer-break	Bobine d'induction à interrupteur à marteau	Rochetto d'induzione a martello	Bobina de chispa con interruptor de martillo	Funkeninduktor mit Hammer unterbrecher
Spark gap	Eclateur à étincelle	Oscillatore	Estallador de chispa	Funkenstrecke

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Spark gap, micrometric	Eclateur à intervalle micromètique	Oscillatore micrometrico	Estallador micrometrico	Micrometer Funkenstrecke
Spark micrometer	Micromètre à étincelles	Micrometro di scintilla	Micrómetro de chispa	Funkenmikrometer
Spark gap, multiple	Eclateur en série	Oscillatore multiplo	Estallador de chispa múltiple	Unterteilte Funkenstrecke
Spark quenched	Etincelle étouffée	Scintilla smorzata	Chispa extinguida	Löschfunke
Sparking distance	Distance explosive	Distanza esplosiva	Distancia explosiva	Funkenstrecke
Starter, automatic	Démarreur, automatique	Avviatore automatico	Reostato de arranque, automático	Selbstanlasser
Starter, combined with shunt regulator	Rhéostat de démarrage avec rhéostat de champ	Reostato di avviamento combinato con regolatore in derivazione	Reostato de arranque y regulador de campo combinados	Anlasswiderstand mit nebenschlussregler
Starter, single-phase	Démarreur monophasé	Avviatore per corrente monofase	Reostato de arranque monofásico	Einphasenanlasser
Starter, three-phase	Démarreur tri-phasé	Acciatore per corrente trifase	Reostato de arranque trifásico	Dreiphasenanlasser
Station, airship	Station de ballon dirigeable	Stazione per aeronave	Estación para globos dirigibles	Luftschiffstation
Station, cart type	Station du type sur voiture	Stazione del tipo su carri	Estación tipo de carros	Karrenstation. Fahrbar [station
Station, cavalry	Poste de cavalerie	Stazione per cavalleria	Estación de cavalería	Kavalleriestation
Station, high-power	Station à grande puissance	Stazione di grande potenza	Estación de gran potencia	Kraftstation
Station, knapsack	Poste de Havresac	Stazione da zaino	Estación de mochilas	Tornisterstation
Station, landing	Poste de débarquement	Stazione da sbarco	Estación de desembarco	Landungsstation
Station, long-distance	Poste de grandes distances	Stazione ultrapotente	Estación de gran alcance	Radiotelegraphische Grossstation
Station, portable	Station portative	Stazione portatile	Estación portátil	Tragbare station
Station, portable military	Poste Militaire transportable	Stazione militaire mobile	Estación militar portátil	Tragbare Militärstation
Station, radiotelegraph	Poste radiotélégraphique	Stazione radiotelegrafica	Estación radiotelegráfica	Funkenamt
Station, small-power	Station à faible puissance	Stazione di piccola potenza	Estación de pequeña potencia	Kleinstation
Switch, aerial wire change-over	Commutateur d'antenne	Commutatore dell'antenna	Conmutador para cambio de hilos de antena	Luftdrahtumschalter
Switch, automatic	Interrupteur automatique	Interruttore automatico	Interruptor automático	Selbsttaetiger Schalter
Switch, automatic field break	Interrupteur automatique d'excitation	Interruttore automatico ad eccitazione	Interruptor automático del campo	Selbsttaetiger Magnetausschalter
Switch, carbon break	Interrupteur à contacts de charbon	Interruttore a carbone	Interruptor con contactos de carbón	Kohlenschalter
	Commutateur	Commutatore	Conmutador	Umschalter

Switch, charging	Interrupteur de charge	Interruttore di carica	Conmutador de carga	Ladeschalter
Switch, combined fuse and circuit	Interrupteur avec coupe circuit	Fusibile ed interruttore combinati	Interruptor con fusible	Schalter und Sicherung-kombiniert
Switch, double-bladed knife	Interrupteur bipolaire à lames	Interrutore doppio a coltello	Interruptor de cuchillo, bipolares	Doppelmesserschalter
Switch, double-pole	Interrupteur bipolaire	Interrutore bipolare	Interruptor bipolar	Zweipoliger Schalter
Switchboard, d.c. and a.c.	Tableau de distribution pour courant continu et alternatif	Quadro di distribuzione per corrente continua ed alternata	Cuadro de distribución de c.a. y c.c.	Schalttafel fuer Gleich und Wechselstrom
Switch, field-break	Interrupteur de l'excitation	Interruttore ad eccitazione	Interruptor del campo	Magnetausschalter
Switch, high-tension	Interrupteur pour haute tension	Interruttore per alta tensione	Interruptor de alta tensión	Hochspannungschalter
Switch, high-tension remote control	Tèlèinterrupteur pour haute tension	Interruttore ad alta tensione comandato a distanza	Teleinterruptor de alta tensión	Hochspannungsfernschalter
Switch, knife	Interrupteur unipolaire a lames	Interruttore a coltello	Interruptor de cuchillo	Messerschalter
Switch, main	Interrupteur principal	Interruttore principale	Interruptor principal	Hauptschalter
Switch, oil-break	Interrupteur à bain d'huile	Interruttore ad olio	Interruptor con baño de aceite	Oelschalter
Switch, press (toggle)	Interrupteur à pression	Interruttore a pressione	Interruptor de tornillo	Druckschalter
Switch, quick-break	Interrupteur à rupture brusque	Interruttore a scatto rapide	Interruptor de rotura brusca	Momentschalter
Switch, single-pole	Interrupteur unipolaire	Interruttore unipolare	Interruptor monopolar	Einpoligerschalter
Switch, three-phase	Interrupteur pour courant tri-phasé	Interruttore tripolare	Interruptor trifásico	Drehstromschalter
Switch, three-way	Commutateur à trois directions	Commuttatore a tre vie	Conmutador de tres pasos	3 Wege Umschalter
Switch, voltmeter	Interrupteur du voltamètre	Interruttore per voltometro	Interruptor para voltímetro	Voltmeterumschalter
Syntonisation	Syntonisation	Sintonizzazione	Sintonización	Abstimmung.
Syntonised wireless telegraphy	Télégraphie sans fil syntonisée	Radiotelegrafia sintonica	Telegrafía sin hilos sintonizada	Abstimmbare Drahtlose-telegraphie
Table, operating	Table de manipulation	Tavola per il servizio radio-telegrafico	Mesa de aparatos	Radiotelegrafischer Bedienungstisch (Apparattisch)
Tapper	Frappeur	Decoherer	Decohesor de martillo	Klopfer
Telegraphy, directional wireless	Radiotélégraphie dirigée	Radiotelegrafia a sistema dirigibile	Telegrafía sin hilos dirigida	Gerichtete Drahtlose Telegraphie
Transformer	Transformateur	Transformatore	Transformador	Transformator
Transformer, high-frequency oscillation	Transformateur d'oscillation à haute fréquence	Transformatore delle correnti oscillatorie ad alta frequenza	Transformador de oscilaciones de alta frecuencia	Umformer fuer Hochfrequenzschwingungen
Transformer, oscillatory	Transformateur d'oscillation	Transformatore delle correnti oscillatorie	Transformador oscilatorio	Oscillationsumformer

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Transmitting arrangement	Dispositif d'emission	Dispositivo di transmissione	Dispositivo de transmision	Senderanordnung
Transmitter cavalry	Transmetteur pour cavalerie	Transmettitore di stazione per cavalleria	Transmisor para estación de cavaleria	Kavalleriesendeapparat
Transmitter, inductive	Transmetteur à couplage inductif	Transmettitore ad accopiamento induttivo	Transmisor de acoplamiento de induccion	Gekoppelte Sender
Transmitter, sharply-tuned	Transmetteur à syntonisation aigüe	Transmettitore acutamente sintonizzato	Transmisor de sintonización aguda	Scharf abgestimmte Sender
Transmitter, simple (P.A.)	Dispositif d'emission directe	Transmettitore semplice	Transmisor sencillo	Einfacher Sender
Tremblers	Trembleurs	Interruttore a martello	Tembladores	—
Trembler, cantilever	—	—	Temblador de canecillo	—
Trench, covered in for wiring	Canalisation souterraine	Fossa coperta per cavi elettrici	Zanja cubierta para cables	Abgedeckter Kabelgraben
Tube, ebonite	Tube en ébonite	Tubo di ebanite	Tubo de ebonita	Ebonitroehre
Tuning	Syntonisation	Sintonizzazione	Sintonización	Abstimmen
Tuning, flat	Syntonisation non aïgue	Sintonizzazione piana	Sintonización aplastada	Unscharfes abstimmen
Tuner, multiple	Syntonisateur multiple	Sintonizzatore multiplo	Sintonizador múltiple	Vielfach Abstimmapparat
Tuning, note	Hauteur de la note	Sintonizzazione della nota	Sintonización de la nota	Tonhöhe der abstimmung
Tuning, note and wave	Note et onde de syntonisation	Sintonizzazione della nota e dell' onda	Sintonización de la nota y de la onda	Abstimmen von Tonhöhe und Welle
Tuning wave	Onde de syntonisation	Sintonizzazione della onda	Sintonización de la onda	Welle der Abstimmung
Valve	Valve	Valvola	Válvula	Ventil
Valve, vacuum	Valve à vide	Valvola a vuoto	Válvula de vacio	Vakuum ventil
Voltage	Voltage	Potenziale	Voltaje	Spannung
Voltmeter, a.c.	Voltmètre pour courant alternatif	Voltometro per corrente alternata	Voltímetro c.a.	Voltmeter fur Wechselstrom
Voltmeter, aperiodic	Voltmètre apériodique	Voltometro aperiodico	Voltímetro aperiódico	Aperiodisches Voltmeter
Voltmeter, d.c.	Voltmètre pour courant continu	Voltometro per corrente continua	Voltímetro c.c.	Voltmeter fuer Gleichstrom
Voltmeter, hotwire	Voltmètre à fil chaud	Voltometro a filo caldo	Voltímetro térmico	Hitzdrahtvoltmeter
Voltmeter, switch	Interrupteur de voltmètre	Interruttore per voltometro	Voltímetro, interruptor para	Voltmeterumschalter
Wagon apparatus	Voiture portant les appareils	Carro per gli apparecchi	Aparatos sobre carros	Apparatekarren
Wagon, dynamo	Voiture portant le générateur	Carro per il generatore	Dinamo sobre carros	Kraftkarren-Kraftwagen
Wavelength	Longueur d'onde	Lunghezza d'onda	Longitud de onda	Wellenlaenge
[illegible]	Ondamètre	Ondametro	Ondámetro	Wellenmesser

USEFUL DATA

WEIGHTS AND MEASURES

Avoirdupois Weight.

drachms.	oz.	lbs.	qrs.	cwts.	ton.	French grammes.
1 =	·0625 =	·0039 =	·000139 =	·000035 =	·00000174 =	1·771846
16 =	1	= ·0625 =	·00223 =	·000558 =	·000028	= 28·34954
256 =	16	= 1	= ·0357	= ·00893	= ·000447	= 453·59
7168 =	448	= 28	= 1	= ·25	= ·0125	= 12,700
28672 =	1792	= 112	= 4	= 1	= ·05	= 50,802
573440 =	35840 =	2240 =	80	= 20	= 1	= 1,016,048

Troy Weight.

grains.	dwts.	oz.	lb.	French grammes.
1 =	·04167 =	00208 =	·0001736 =	·0648
24 =	1 =	·05 =	·004167 =	1·555
480 =	20 =	1 =	·0833 =	31·1035
5760 =	240 =	12 =	1 =	373·242

7000 grains troy = 1 lb. avoirdupois.
175 lbs. troy = 144 lbs. avoirdupois.
lbs. avoirdupois × 1·2153 = lbs. troy.
lbs. troy × ·82286 = lbs. avoirdupois.

Long Measure.

ins.	feet.	yards.	fath.	poles.	furl.	mile.	French metres.
1 =	·083 =	·02778 =	·0139 =	·005 =	·000126 =	·0000158 =	·0254
12 =	1 =	·333 =	·1667 =	·0606 =	·00151 =	·0001894 =	·3048
36 =	3 =	1 =	·5 =	·182 =	·00454 =	·000568 =	·9144
72 =	6 =	2 =	1 =	·364 =	·0091 =	·001136 =	1·8287
198 =	16½ =	5½ =	2¾ =	1 =	·025 =	·003125 =	5·0291
7920 =	660 =	220 =	110 =	40 =	1 =	·125 =	201·16
63360 =	5280 =	1760 =	880 =	320 =	8 =	1 =	1609·315

Measure of Capacity.

pints.	gall.	peck.	bushel.	quarter.	wey.	last.	cub. ft.	litres.
1 =	·125 =	·0625 =	·01562 =	·00195 =	·00039 =	·000195 =	·02 =	·5676
8 =	1 =	·5 =	·125 =	·0156 =	·00312 =	·00156 =	·1604 =	4·543
16 =	2 =	1 =	·25 =	·03125 =	·00625 =	·00312 =	·3208 =	9·082
64 =	8 =	4 =	1 =	·125 =	·025 =	·0125 =	1·283 =	36·32816
512 =	64 =	32 =	8 =	1 =	·2 =	·1 =	10·264 =	290·625
2560 =	320 =	160 =	40 =	5 =	1 =	·5 =	51·319 =	1453·126
5120 =	640 =	320 =	80 =	10 =	2 =	1 =	102·64 =	2906·25

1 gallon in wine, ale, or dry measure
= 277¼ cubic inches = ·16 cubic foot
= 10 lbs. of distilled water =
Cube feet × 6·2355 = gallons.
Cube ins. × ·003607 = gallons.
1 bushel = 2218·19 cube inches = 1·28 cube foot.
Cube feet = ·78 = bushels.
Cube ins. × ·00045 = bushels.

APPROXIMATE VALUES OF BRITISH & FRENCH MEASURES

Linear.

One millimetre (·001 metre) = ·04 inches, or $\frac{4}{100}$ inch, or two-thirds of $\frac{1}{16}$ inch, or $\frac{1}{25}$ inch nearly.

One centimetre (·010 metre) = ·4 inches, or $\frac{4}{10}$ inch nearly.

One decimetre (·100 metre) = 4 inches nearly (exactly $3\frac{15}{16}$ inches).

One metre = 3·28 feet = 3 feet 3 inches and $\frac{3}{8}$ (all but $\frac{1}{512}$ inch) = 40 inches nearly ($\frac{1}{64}$ or 1·6 per cent. less).

To convert metres into inches, multiply by 40.

To convert metres or parts of metres into yards, add $\frac{1}{11}$.

One kilometre (1,000 metres) is about $\frac{5}{8}$ mile (it is 0·6 per cent. less).

One inch is about 25 millimetres (exactly 25·4).

One yard is $\frac{11}{12}$ of a metre. Thus 11 metres are equal to 12 yards.

One inch is about $2\frac{1}{2}$ centimetres (exactly 2·54).

To convert inches into metres, divide by 40.

One mile is about $1\frac{5}{8}$ kilometres (it is 1 per cent. less).

AREA.

One square centimetre is about $\frac{1}{6.5}$ part of a square inch, or ·155 square inch.

One square inch is 6·5 square centimetres.

One square metre contains nearly 11 square feet, or nearly $1\frac{1}{5}$ square yards.

One square yard is nearly $\frac{6}{7}$ of a square metre.

One acre is over 4,000 square metres (it is about 1·2 per cent. more).

One square mile is nearly 260 hectares or metrical acres (10,000 square metres). It is about 0·4 per cent. less.

VOLUME.

One cubic yard is about $\frac{3}{4}$ cubic metre (it is 2 per cent. more).

One cubic metre is nearly $1\frac{1}{3}$ cubic yards (it is $1\frac{3}{5}$ per cent. less).

One cubic metre is nearly $35\frac{1}{3}$ cubic feet (it is ·05 per cent. less).

One litre is over $1\frac{3}{4}$ pints (it is 0·57 per cent. more).

One gallon contains above $4\frac{1}{2}$ litres (it holds about 1 per cent. more).

One kilolitre (a cubic metre) holds nearly 1 ton of water at 62° Fah. ($1\frac{3}{4}$ per cent. less).

One cubic foot contains 28·3 litres.

WEIGHT.

One gramme is nearly $15\frac{1}{2}$ grains (about $\frac{1}{2}$ per cent. less). 1 lb. at London = 445,000 dynes.

One kilogramme is about $2\frac{1}{5}$ lbs. (about $\frac{1}{4}$ per cent. more).

One thousand kilogrammes, or a metric ton, is nearly one English ton (about $1\frac{1}{2}$ per cent. less).

One hundredweight is nearly 51 kilogrammes ($\frac{2}{5}$ per cent. less).

One kilogrammetre is = 7·233 ft. lbs.

One foot pound = ·138 kilogrammetres.

The CHAIN, in LAND MEASURE, is subdivided into 4 *poles* or *perches* (each of $5\frac{1}{2}$ yards) and 100 *links* (each of 7·92 inches).

	Inches.	Feet.	Yards.	Statute Miles.	Metres.
Chain,	792	66	22	$\frac{1}{80}$	20·11662

A FATHOM is six feet.

In approximate work the fathom is taken as $\frac{1}{1000}$, or ·001 nautical mile.

The GEOGRAPHICAL, NAUTICAL, or SEA MILE, or NAUT, depends on the dimensions of the earth, which are known approximately only. The following are estimates of its value:—

	Feet nearly.	Statute Mile nearly.	Metres nearly.
Mean length of one minute of longitude at the equator; being the nautical mile by Admiralty Regulation . . .	6,086	1·1527	1,855
Mean length of one minute of latitude	6,076	1·1508	1,852
One telegraph naut. = 2,029 yds.	6,087	1·1528	1,855·3

The nautical mile is sometimes subdivided into 10 *cables* and 1,000 *fathoms;* the fathom thus obtained being about $\frac{1}{80}$ part longer than the common fathom.

The French *nœud* = British nautical mile.

A LEAGUE is three nautical miles.

A KNOT is a velocity of one nautical mile per hour = 6,086 feet per hour.

MEASURES IN WHICH GEOGRAPHICAL DISTANCES ARE EXPRESSED IN VARIOUS COUNTRIES

		Length in English Yards.		English Miles.		English Miles.		Miles, etc., of different Countries.
Arabia	Mile	2,148	100 =	122·04	and	100	=	81·93
Austria	Mile	10,126	do.	575·34	,,	do.		17·38
Bohemia	Mile	10,137	do.	575·96	,,	do.		17·36
Brabant	League	6,076	do.	345·22	,,	do.		28·96
Burgundy	League	6,183	do.	351·66	,,	do.		28·46
China	Li	632	do.	35·91	,,	do.		278·48
Denmark	Mile	8,244	do.	468·41	,,	do.		21·35
England	Mile	1,760	do.	100·00	,,	do.		100·00
Flanders	League	6,864	do.	390·00	,,	do.		25·64
France	Kilometre	1,093	do.	62·10	,,	do.		161·02
Hamburg	Mile	8,244	do.	468·41	,,	do.		21·35
Hanover	Mile	11,559	do.	656·76	,,	do.		15·22
Hesse	Mile	10,547	do.	599·26	,,	do.		16·68
Holland	Mile	8,101	do.	460·28	,,	do.		21·72
Hungary	Mile	9,113	do.	517·78	,,	do.		19·31
Italy	Mile	2,025	do.	115·05	,,	do.		86·91
Norway	Mile	12,352	do.	701·83	,,	do.		14·25
Portugal	League	6,760	do.	384·09	,,	do.		26·03
Prussia	Mile	8,237	do.	480·68	,,	do.		21·37
Rome	Mile	1,628	do.	92·50	,,	do.		108·11
Russia	Verst	1,167	do.	66·30	,,	do.		150·81
Saxony	Mile	9,905	do.	562·78	,,	do.		17·76
Silesia	Mile	7,083	do.	402·44	,,	do.		24·84
Spain	Common Legua of 8,000 Varas	7,416	do.	421·36	,,	do.		23·73
Spain	Legal Legua of 5,000 Varas	4,635	do.	275·34	,,	do.		37·97
Swabia	Mile	10,126	do.	563·35	,,	do.		17·38
Sweden	Mile	11,700	do.	664·77	,,	do.		15·04
Switzerland	Mile	9,153	do.	520·05	,,	do.		19·23
Turkey	Berri	1,826	do.	103·75	,,	do.		96·38
Tuscany	Mile	1,808	do.	102·72	,,	do.		97·34
Westphalia	Mile	12,151	do.	690·39	,,	do.		14·48

CONTINENTAL WEIGHTS AND MEASURES WITH THEIR ENGLISH VALUES.

The Metric System of Weights and Measures, with trifling variations of denomination, has been adopted in the following countries :—

AUSTRIA	GERMANY	ITALY	SERVIA
BELGIUM	*GREECE	NORWAY	SPAIN
DENMARK	HOLLAND	PORTUGAL	SWEDEN
FRANCE	HUNGARY	§ROUMANIA	SWITZERLAND
	§TURKEY		

Linear Measure:
- 1 Centimètre = 0·3937 inch.
- 1 METRE = 39·3701 inch = 3·28 feet = 1·093 yard
- 1 Kilomètre = 1093·6 yards = 0·62137 mile.

Weight:
- 1 Milligramme = 0·015 grains troy.
- 1 GRAMME = 15·43 ,, ,,
- 1 Kilogramme = 2·205 lb. avoirdupois.
- 1 Quintal métrique = 100 kilogramme = 220·5 ,, ,,
- 1 Tonneau = 1000 ,, = 2205 ,,

Measure of Capacity ... 1 LITRE = 1·75 pint.

* In Greece the following weights may be used :
1 Oke = 2·80 lbs. avoirdupois.
1 Stater = 44 Oke = 123·2 lbs. avoirdupois.

§ In Turkey and Roumania the following weights are also used :
1 Oke = 2·83 lbs. avoirdupois.
1 Kintal = 44 Oke = 125 lbs. avoirdupois.

RUSSIAN WEIGHTS AND MEASURES.—Verst = 0·663 mile. 1 Pood = 40 Pund = 36·12 lbs. avoirdupois. 1 Vedru = 2·7 imperial gallons.

1 Degree = 60 geographical miles = 69 1-6th English statute miles = 9·85 Norway miles = 10·41 Swedish miles = 14·77 Danish miles = 15 German miles = 20 Holland ure = 23·15 Swiss stunden = 104·3 Russian versts = 111·3 French kilomètres.

WEIGHTS AND MEASURES.—A penny weighs ⅓ oz., or 10 grammes; a halfpenny, ⅙ oz. A French centime weighs a gramme; its diameter equals a centimètre, and 100 in a row equal a mètre. 1 centimètre = 10 millimètres = 4-10th of an inch; or 2½ centimètres = 1 inch. An inch is the diameter of a halfpenny. A penny is 1-10th foot in diameter.

FOREIGN AND COLONIAL WEIGHTS AND MEASURES, WITH THEIR EQUIVALENTS IN BRITISH STANDARDS

ARGENTINE REPUBLIC.—Since January 1st, 1887, the use of the French Metric System is compulsory. Other measures sometimes used are—

The Quintal	= 101·40 lbs. avoirdupois
,, Arroba	= 25·35 ,, ,,
,, Fanega	= 1½ Imperial bushels

AUSTRO-HUNGARY.—Metric system. This system also compulsory in Bosnia-Herzegovina from September 1st, 1912.

BELGIUM.—Metric system.

BOLIVIA.—Metric system legal.

The Libra	... ...	=	1·014 lb. avoirdupois
„ Quintal	... ...	=	101·44 lbs. „
„ Arroba	of 25 pounds ...	=	25·36 „ „
	of wine or spirits	=	6·70 Imperial gallons
„ Gallon	... ...	=	0·74 „ gallon
„ Vara	... ...	=	0·927 yard
„ Square vara	... ...	=	0·859 square yard

BRAZIL.—The Metric system is compulsory, and is used in all official departments. The old weights and measures, which are still partly employed, are—

The Libra	... ...	=	1·012 lbs. avoirdupois
„ Arroba	... ...	=	32·38 „ „
„ Quintal	... ...	=	129·54 „ „
„ Alqueire (of Rio)	...	=	1·1 Imperial bushel
„ Oitava	... ...	=	55·34 grains

CANADA.—The legal Weights and Measures are the Imperial yard, Imperial pound avoirdupois, Imperial gallon, and the Imperial bushel. By Act 42 Vict., cap. 16, the British hundredweight of 112 pounds and the ton of 2,240 pounds were abolished, and the hundredweight was declared to be 100 pounds, and the ton 2,000 pounds avoirdupois as in United States, but sometimes contracts stipulate for the British weights.

CHILI.—Metric system legal, and now in general use. Old measures are—

The Ounce = 1·014 oz. avoirdupois.
„ Libra = 1·014 lb. avoirdupois. 25 libras = 1 arroba.
„ Quintal = 101·44 lb. avoirdupois. 20 quintals = 1 tonelada.
„ Vara = 0·927 yard.
„ Square vara = 0·859 square yard.

CHINA.

Weights—10 Ch'ien	...	=	1 Liang (Tael) = 1·333 oz. avoirdupois or 37·78 grammes
16 Liang	...	=	1 Kin (Catty) = 1·333 lbs. avoirdupois or 604·53 grammes.
100 Chin	...	=	1 Tan (Picul) = 133·333 lbs. avoirdupois or 60·453 kilogrammes.

4 ozs. = 3 taels; 1 lb. = ¾ catty or 12 taels; 1 cwt. = 84 catties; 1 ton = 16 piculs 80 catties.

Capacity—10 Ko	... ...	=	1 Sheng (pint) = 1·031 litre
10 Sheng...	...	=	1 Tou (peck) = 10·31 litre (holding from 6½ to 10 Kin of rice and measuring from 1·13 to 1·63 gallon)

Commodities, even liquids, such as oil, spirits, etc., are commonly bought and sold by weight.

Length—10 Fen	...	... =	1 Ts'un (inch)
10 Ts'un	...	... =	1 Chi'h (foot) = 14·1 English inches by treaty
10 Chi'h	...	... =	1 Chang = 11 ft. 9 in. (141 in. by treaty)
1 Li	...	... =	$\frac{1}{3}$ English mile (about)

The mow, the unit of measurement, is almost exactly one-sixth of an acre.

In the tariff settled by treaty between Great Britain and China, the Chi'h of 14 $\frac{1}{10}$ English inches has been adopted as the legal standard. The standards of weight and length vary all over the Empire, the Chi'h ranging from 9 to 16 English inches, and the Chang (=10 Chi'h) in proportion; at the treaty ports, the use of foreign treaty standard of Chi'h and Chang is common.

In October, 1907, a decree for uniform weights and measures was issued, making the K'up'ing or Treasury Scale the standard weight. The K'up'ing tael or ounce weighs 575·64 grains. The Haikwan tael weighs 581·47 grains.

Colombia.—Metric system introduced in 1857. In liquid measure the French litre is the legal standard.

The Kilogramme	...	...	... =	2·204 lbs. avoirdupois
,, Arroba	...	...	... =	12½ kilos, or 25 Colombian lbs.
,, Quintal	...	...	... =	50 ,, 100 ,, ,,
,, Carga	...	...	... =	125 ,, 250 ,, ,, .
,, Libra	...	...	... =	1·102 lbs. avoirdupois
,, Vara	...	...	... =	80 centimetres = about 31 inches.

Denmark.—The Metric system has been officially adopted, and under the law of May, 1907, is obligatory in public offices since April 1st, 1910, and generally since April 1st, 1912.

The Pund = 100 Kvint = 1,000 Ort = 1·1023 lb. avoirdupois.

The Centner = 100 Pund = 50 kilos = 110·23 lbs. avoirdupois.

Tœnde, grain = 1·3912 hectolitre = 3·827 bushels.

,, oil = 28·9189 gallons.

,, butter = 224 Pund = 112 kilos = 246·9179 lbs. avoirdupois.

,, coal = 1·7004 hectolitre = 4·6775 bushels.

Pot = 0·9661 litres = 0·2126 gallons.

Viertel = 8 potter = 7·729 litres = 1·7011 gallons.

Ship Last = 2 tons.

Alen (= 2 Fod) = 0·6277 metres = 0·6864 yard.

Kubik fod = 0·031 cubic metre = 1·0918 cubic feet.

Tœndeland = 0·55 hectares = 1·36 acres.

Register ton for sailing ships = 1 ton reg.

,, ,, steamers = 0·89 ton reg.

EGYPT.—The Metric system is generally used.

The Ardeb is used as the unit in all transactions in grain, etc., and is equal to 5·44739 bushels or 43·579 gallons.

The approximate weight of the Ardeb in rotls is—Wheat, 315; Beans, 320; Barley, 250; Maize, 315; Cotton Seed, 270.

Okieh	=	1·3206 ounce
Rotl	=	·99049 lb.
Oke	=	2·7513 lbs.
Cantar, or 100 Rotls or 36 Okes	=	99·0492 lbs.
Diraa Baladi (town)... ...	=	22·8350 inches
Diraa Mimari, for Buildings, &c.	=	29·52812 ,,
Kassabah = 3·88 yards ...	=	139·7663 ,,

Feddan, the unit of measure for land, = 333⅓ sq. kassabahs = 1·03808 acre.

Pic = 6·43 sq. feet	=	·562 sq. Metre

Coal is sold by the British ton and water by ton of one cubic metre.

FRANCE.—Gramme	=	15·43 grains troy
Kilogramme	=	2·205 lbs. avoirdupois
Quintal Metrique	=	220½ ,, ,,
Tonneau	=	2,205 lbs.
Litre (Liquid)	=	1·76 pint
Hectolitre (Liquid)	=	22 gallons
,, (Dry)	=	2·75 bushels
Mètre	=	39·37 inches
Kilometre	=	1,093 yards
Mètre Cube (Stère)	=	35·314 cubic feet
Hectare	=	2·471 acres
Kilomètre Carré	=	·386 square mile

GERMAN EMPIRE.—The Metric system came into force on January 1st, 1872.

The Gram	=	15·43 grains troy
,, Kilogram	=	2·205 lbs. avoirdupois
,, Tonne, 1,000 Kgs. ...	=	2,205 lbs. = 19·7 cwt.
,, Liter, Mass	=	1·76 Imperial pint
,, Meter, Stab	=	3·28 feet, or 39·37 inches
,, Kilometer	=	1·094 yards (·621 mile), or nearly 5 furlongs
,, Hektar	=	2·47 acres
,, Quadrat, or Sq. Kilometer	=	247 acres.

GREECE.—Metric system introduced 1898.

The Oke	=	2·80 lbs. avoirdupois
,, Cantar	=	123·20 ,, ,,

The Livre	=	1·05 lbs. avoirdupois
„ Baril (wine)	=	16·33 Imperial gallons
„ Kilo	=	0·114 „ quarter
„ Pike	=	¾ of an English yard
„ Stremma...	=	·242 of an English acre

HOLLAND (THE NETHERLANDS).—The Metric system and, with trifling changes, the Metric Denominations are used.

INDIA.—The Maund of Bengal,

40 Seers	=	82 2/7 lbs. avoirdupois
The Maund of Madras ...	=	25 „ „ (nearly)
„ Tola	=	180 grains troy
„ Guz of Bengal	=	36 inches

An Act to provide for the adoption of an uniform system of weights and measures was passed in 1871. The Act orders: " Art. 2. The primary standard of weight shall be called a seer, and shall be a weight of metal in the possession of the Government of India, equal, when weighed in a vacuum, to the weight known in France as the kilogramme = 2·205 lbs. avoirdupois." " Art. 3. The units of weight and measures of capacity shall be, for weights, the said seer; for measures of capacity, a measure containing one such seer of water at its maximum density, weighed in a vacuum. Unless it be otherwise ordered, the sub-divisions of all such weights and measures of capacity shall be expressed in decimal parts." This Act, however, has never been in operation.

ITALY.—Same as in France, the names only being altered—the kilogramme into the chilogramma, the mètre into the metro, the hectare into the ettaro, etc.

The Grammo	=	15·434 grains troy
„ Chilogramma	=	2.20 lbs. avoirdupois
„ Quintale Metrico ...	=	220 „ „
„ Tonnellata	=	2,200 „ „
„ Litro, Liquid Measure..	=	0·22 Imperial gallon
„ Ettolitro „ „ ...	=	22 „ „
„ Ettolitro, Dry Measure	=	2·75 „ bushels
„ Metro	=	3·28 feet or 39·37 inches
„ Chiiometro	=	1,093 yards
„ Metro Cubo	=	35·31 cubic feet
„ Ettaro or Hectare ...	=	2·47 acres
„ Square Chilometro ...	=	0·386 square mile (2·59 sq. chilo. = 1 sq. mile)

JAPAN.—The Mommé	=	2·11 drams or 2·41 dwts. or 120 mommé = 1 lb. avoirdupois

The Kin (Catty) = 160 mommé = 1·322 lb. avoirdupois (0·266 mommé = 1 gramme) or 1·60 lbs. troy
,, Picul (100 kin) ... ... = 132·27 lbs.
,, Kwan = 1,000 mommé... = 8·261 lbs. avoirdupois or 10·04 lbs. troy
,, Shaku ... ... = ·994 foot (3·3 shaku = 1 metre)
,, Kujira Shaku ... ... = 1·242 feet
,, Sün ... ... = 1·193 inches
,, Ken = 6 Shaku ... ... = 5·965 feet
,, Jo = 10 Shaku ... ... = 9·942 feet
,, Chô = 60 Ken ... ... = 357·916 feet, or about 1/15 mile
,, Ri = 36 Chô ... ... = 2·44 miles
,, Ri (marine) ... ... = 1·15 mile
,, Ri (square) ... ... = 5·9552 square miles
,, Chô = 10 tan ... ... = 2·45 acres
,, Koku, Liquid = 10 To = 100 Sho = 39·7033 gallons
,, Koku, Dry ... ... = 4·9629 bushels
,, Koku (capacity of vessel) = 1/10 ton
,, To, Liquid ... ... = 3·9703 gallons
,, To, Dry ... ... = 1·9851 peck

MEXICO.—The Metric system is generally used in commercial transactions, but the old Spanish Measures are sometimes used. The principal ones are—

1 Libra ... ... = 1·014 lb. avoirdupois
1 Arroba = 25 Libras ... = 25·357 lbs. ,,
1 Vara = 0·837 metre ... = 2 feet 8 9/10 English inches
1 Legua comun ... ... = 6,666⅔ varas

NORWAY.—The Metric system was introduced in 1879, and became obligatory July 1st, 1882.

The Kilogram = 1,000 gram = 2·204 lbs. avoirdupois
,, Meter = 100 centimeter = 3·28 feet, or 39·37 English inches
,, Hektoliter, Liquid Measure = 100 liter = 22 Imperial gallons
,, Hektoliter, Dry Measure = 100 liter = 2·75 Imperial bushels
,, Kilometer = 1,000 meter = 1,094 yards, or 0·621 of English mile

PERU.—The French Metric system was established by law in 1860. Old measures are—

The Ounce ... ... = 1·014 ounce avoirdupois
,, Libra ... ... = 1·014 lb. ,,
,, Quintal ... ... = 101·44 lbs. ,,
,, Arroba of 25 pounds ... = 25·36 lbs. ,,
,, Arroba of wine or spirits = 6·70 Imperial gallons
,, Gallon ... ... = 0·74 ,,
,, Vara ... ... = 0·927 yard
Square Vara ... ... = 0·859 square yard

PORTUGAL.—The Metric system is the legal standard. The principal old measures still in use are—

The Libra	=	1·012 lb. avoirdupois
,, Almude of Lisbon ...	=	3·7 Imperial gallons
,, Almude of Oporto ...	=	5·6 ,, ,,
,, Alqueire	=	0·36 ,, bushel
,, Moio	=	2·78 ,, quarters

ROUMANIA.—Metric system, but Turkish weights and measures are also used.

RUSSIA.—1 Verst (500 sajènes)...	=	3,500 feet, or two-thirds of a statute mile
1 Sajène (3 arshins)... ...	=	7 feet
1 Arshin (16 vershok) ...	=	28 inches
1 Square Verst	=	0·43941 square mile
1 Dessiatine	=	2·69972 acres
1 Pound (96 zolotniks = 32 lot)	=	$\frac{8}{10}$ of a pound or 14·4 ounces
1 Pood (40 pounds)	=	36·113 lbs. = 0·32244 cwt. or 100 poods = 1·6121 tons. Baltic Freight is usually quoted per ton of 62 poods
1 Vedro (8 shtoffs)	=	$2\frac{3}{4}$ Imperial gallons
1 Chetvert (8 chetveriks) ...	=	5·77 Imperial bushels or 46·2 gals.

SERVIA.—Metric system in use.

SPAIN.—The Metric system was introduced into Spain on January 1st, 1859, and is generally used.

SWEDEN.—Metric system introduced 1879, and became obligatory 1889. British measures are often used in wood and coal trades. The old measures below are sometimes used locally, but to a very small extent.

The Skalpund = 100 ort ...	=	0·937 lb. avoirdupois
,, Fot = 10 tum	=	11·7 English inches
,, Kanna = 140 kubikitum	=	4·6 Imperial pints
,, Mil = 360 ref	=	6·64 English miles

TURKEY.—The Oke, of 400 drams	=	2·8283 lbs. avoirdupois
The Almud	=	1·151 Imperial gallon
,, Kileh	=	0·9120 Imperial bushel
44 Okes = 1 Cantar or Kintal	=	124·3616 lbs. avoirdupois
39·6263 Okes	=	1 cwt.
180 Okes = 1 Tcheké ...	=	509·095 pounds
1 Kileh = 20 Okes	=	0·36 Imperial quarter
816 Kilehs	=	100 Imperial quarters

The Aerials on the passenger coaches of the Lackawanna train fitted with Marconi Wireless Apparatus.

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The Andaze (cloth measure)	=	26·77 inches
„ Arshin (land measure)...	=	6·0548 square feet
„ Dönüm (land measure)	=	1,600 sq. Arshins = 1,076·40 sq. yds.

The Kileh is the chief measure for grain, 100 kilehs are equal to 12·128 Imperial quarters or 35·266 hectolitres.

In 1889 the Metric system of weights was made obligatory for cereals; metric weights were decreed obligatory in January, 1892, but are not enforced.

United States.—British weights and measures are usually employed, but the old Winchester gallon and bushel are used instead of the new or Imperial standards. Different States have a legal standard for bushels of certain articles, such as grain and potatoes, varying from 60 lbs. for wheat to 32 for oats.

Wine gallon	=	0·83333 gallon
Ale gallon	=	1·01695 „
Bushel	=	0·9692 Imperial bushel

Instead of the British cwt. a cental, of 100 lbs., is used. 1 ton = 2,000 lbs., except coal, which is usually 2,240 lbs. wholesale.

NAUTICAL MEASURES

(From "Lloyds' Calendar," by permission of the Committee of Lloyds.)

12 inches	=	1 foot	6 feet	=	1 fathom
3 feet	=	1 yard	3 nautical miles ...	=	1 league

Sea or Nautical Mile = one-sixtieth of a degree of latitude, and varies from 6,046 ft. on the Equator to 6,092 ft. in lat. 60°.

Nautical Mile for speed trials, generally called the Admiralty Measured Mile ... { 6,080 feet; 1·151 statute miles; 1,853 metres

Cable's length = the tenth of a nautical mile; or approximately, 100 fathoms or 200 yards.

A Knot = a nautical mile an hour, is a measure of speed, but is not infrequently, though erroneously, used as synonymous with a nautical mile.

Length of European Measures of Distances compared with the Nautical Mile of 6,080 feet.

	Length in Nautical Miles.		Length in Nautical Miles.
Nautical Mile	1·000	German Ruthen	4·064
British Statute Land Mile	0·868	Italian Mile	1·000
Austrian Mile	4·094	Norwegian Mile	6·097
Danish Mile	4·064	Russian Verst	0·576
French Kilometre	0·539	Swedish Mile	5·769
German Geographical Mile	4·000		

SPEED TABLE

Speed per Hour in Knots.	Nautical Miles per Day.	Nautical Miles per Week.	Speed per Hour in Knots.	Nautical Miles per Day.	Nautical Miles per Week.	Speed per Hour in Knots.	Nautical Miles per Day.	Nautical Miles per Week.
3	72	504	10½	252	1,764	18	432	3,024
3½	84	588	11	264	1,848	18½	444	3,108
4	96	672	11½	276	1,932	19	456	3,192
4½	108	756	12	288	2,016	19½	468	3,276
5	120	840	12½	300	2,100	20	480	3,360
5½	132	924	13	312	2,184	20½	492	3,444
6	144	1,008	13½	324	2,268	21	504	3,528
6½	156	1,092	14	336	2,352	21½	516	3,612
7	168	1,176	14½	348	2,436	22	528	3,696
7½	180	1,260	15	360	2,520	22½	540	3,780
8	192	1,344	15½	372	2,604	23	552	3,864
8½	204	1,428	16	384	2,688	23½	564	3,948
9	216	1,512	16½	396	2,772	24	576	4,032
9½	228	1,596	17	408	2,856	24½	588	4,116
10	240	1,680	17½	420	2,940	25	600	4,200

LENGTH OF A DEGREE IN LATITUDE AND LONGITUDE

Lat.	Degree of Longitude.		Degree of Latitude.		Lat.	Degree of Longitude.		Degree of Latitude.	
°	Stat. Miles.	Naut. Miles.	Stat. Miles.	Naut. Miles.	°	Stat. Miles.	Naut. Miles.	Stat. Miles.	Naut. Miles.
0	69·160	60·000	68·698	59·600	45	48·986	42·498	69·044	59·899
2	·119	59·964	·699	·601	47	47·251	40·993	·068	·920
4	68·992	·855	·702	·603	49	45·459	39·439	·092	·941
6	·783	·673	·706	·607	51	43·611	37·835	·116	·962
8	·491	·419	·712	·612	53	41·710	36·186	·140	·982
10	·116	·093	·719	·618	55	39·758	34·491	·162	60·002
12	67·659	58·697	·728	·625	57	37·756	32·755	·184	·022
14	·120	·229	·738	·634	59	35·707	30·979	·206	·041
16	66·499	57·690	·750	·645	61	33·615	29·164	·228	·059
18	65·797	·081	·764	·657	63	31·481	27·311	·248	·077
20	·015	56·404	·779	·669	65	29·308	25·425	·268	·094
22	64·154	55·657	·795	·683	67	27·100	23·509	·286	·110
24	63·216	54·843	·813	·699	69	24·857	21·564	·302	·124
26	62·201	53·962	·831	·715	71	22·582	19·593	·318	·137
28	61·110	·016	·850	·731	73	20·282	17·597	·333	·149
30	59·944	52·005	·870	·749	75	17·956	15·578	·345	·161
32	58·706	50·931	·892	·767	77	15·607	13·539	·357	·171
34	57·396	49·794	·914	·786	79	13·238	11·484	·367	·179
36	56·016	48·597	·936	·806	81	10·853	9·417	·375	·186
38	54·568	47·340	·959	·826	83	8·456	7·338	·381	·192
40	53·053	46·026	·983	·846	85	6·048	5·248	·387	·196
42	51·473	44·656	69·007	·866	87	3·632	3·151	·390	·199
44	49·830	43·231	·013	·888	89	1·211	1·050	·392	·201

LIGHTHOUSES.

To find the height at which a Light should be put above the sea level to show a given number of miles :—

Multiply the number of miles by itself, and by 4, and divide the product by 7. Thus a lamp required to show ten miles :—

$$10 \times 10 = 100 \times 4 = 400$$
$$7)\overline{}$$
$$57 \text{ feet.}$$

The Light should be 57 feet above the sea level.

"THE BEAUFORT SCALE": THE FORCE OF THE WIND.

[Invented by Admiral Beaufort, 1805. Admiral Sir Francis Beaufort, K.C.B., F.R.S., was Hydrographer of the Navy from 1829 to 1855.]

Figures to denote the Force of the Wind.	Description of Wind.	POWER OF THE WIND as regards a well-conditioned Man of War or First-class Clipper Ship.		Rate of the Wind per Hour in Miles.
0	Calm	—		0 to 2
1	Light air	Just sufficient to give steerage way		3–10
2	Light breeze	With which the above ship with all sail set and clean hull would go in smooth water	1–2 knots ..	11–15
3	Gentle breeze		3–4 " ..	16–20
4	Moderate breeze ..		5–6 " ..	21–25
5	Fresh breeze	In which she could just carry close-hauled	Royals, etc.	26–30
6	Strong breeze		Single Reefs and T.G. sails	31–36
7	Moderate gale		Double Reefs and jib, etc.	37–44
8	Fresh gale		Triple reefs, etc. ..	45–52
9	Strong gale		Close reefs and courses	53–60
10	Whole gale	In which she could just bear close-reefed main topsail and reefed foresail		61–69
11	Storm	Under storm staysails		70–80
12	Hurricane	Bare poles..		above 80

"THE BEAUFORT SCALE": FORMULÆ FOR RECORDING STATE OF THE WEATHER.

B denotes Blue Sky, *i.e.*, clear or hazy atmosphere.
C ,, Cloudy — detached opening clouds.
D ,, Drizzling Rain.
F ,, Fog—FF Thick Fog.
G ,, Gloomy Dark weather.
H ,, Hail.
L ,, Lightning.
M ,, Misty or Hazy—so as to interrupt the view.
O ,, Overcast — *i.e.*, the whole sky covered with an impervious cloud.
P ,, Passing Showers.
Q ,, Squally.
R ,, Rain—continuous rain.
S ,, Snow.
T ,, Thunder.
U denotes Ugly, threatening appearance of the weather.
V ,, Visibility of distant objects.
W ,, Wet dew.
. Dot under any letter, an extraordinary degree.

By the combination of these letters all the ordinary phenomena of the weather may be recorded with certainty and brevity, *e.g.*,

BCM—Blue sky, with detached opening clouds, but hazy round the horizon.

GV—Gloomy dark weather, but distant objects *remarkably* visible.

MEASURES OF TIME.

SIDEREAL DAY.—The standard unit of time is the SIDEREAL DAY, being the period in which the earth turns once round on its axis. It is divided into sidereal hours, minutes, and seconds; but these measures of time are used by astronomers only.

MEAN SOLAR TIME.—A SECOND is the time of one swing of a pendulum adjusted so as to make 86,164·09 swings in a sidereal day. Seconds are usually subdivided decimally.

One MEAN SOLAR DAY = 24 hours = 1,440 minutes = 86,400 seconds = 1·00273791 sidereal day.

RELATION BETWEEN TIME AND LONGITUDE.—At any given instant the mean solar time at two stations differs by an amount

proportional to their difference of longitude, the time at the eastern station being the earlier.

CORRESPONDING DIFFERENCES.

Longitude.	Time.	Longitude.	Time.
15"	1 second.	75°	5 hours.
1'	4 seconds.	90	6 ,,
15'	1 minute.	105	7 ,,
1°	4 minutes.	120	8 ,,
15°	1 hour.	135	9 ,,
30	2 hours.	150	10 ,,
45	3 ,,	165	11 ,,
60	4 ,,	180	12 ,,

To show the exact date of any event, the meridian at which the time is reckoned must be specified. One degree longitude at Equator = 60 nauts = 69·17 statute miles.

STANDARD TIME.

The Hourly Zone System of Standard Time, based on the meridian of Greenwich, has been adopted in many countries, as will be seen from the particulars given below. For Europe the following Standard Times have been adopted :—

WESTERN EUROPE.—Greenwich time.

CENTRAL EUROPE.—Corresponding to the time of the 15th degree of longitude East of Greenwich, or one hour fast of Greenwich time.

EASTERN EUROPE.—Corresponding to the time of the 30th degree of longitude East of Greenwich, or two hours fast of Greenwich time.

The following countries have adopted the meridians mentioned for the purpose of regulating time :—

GREAT BRITAIN, BELGIUM, FRANCE, PORTUGAL, SPAIN, GIBRALTAR, ALGERIA, FAROE ISLANDS.—Meridian of Greenwich or G.M.T.

IRELAND.—Meridian of Dublin, 25m. 21·1s. slow of G.M.T.

HOLLAND.—Meridian of Amsterdam, 19m. 32·1s. fast of G.M.T.

GREECE.—Meridian of Athens, 1h. 34m. 52·9s. fast of G.M.T.

AUSTRIA-HUNGARY, DENMARK, GERMANY, ITALY, MALTA, NORWAY, SERVIA, SWEDEN, SWITZERLAND, TUNIS, CONGO, ANGOLA, GERMAN SOUTH-WEST AFRICA.—Meridian of 15° E., or 1 hour fast of G.M.T.

ICELAND, MADEIRA, LIBERIA and PORTUGUESE GUINEA.—Meridian of 15° West, or 1 hour slow of G.M.T.

AZORES and CAPE VERDE ISLANDS.—Meridian of 30° W., or 2 hours slow of G.M.T.

RUSSIA.—Meridian of Pulkowa, 2h. 1m. 18·6s. East of Greenwich, or practically Eastern European time.

BULGARIA, ROUMANIA, EGYPT, SOUTH AFRICA, CYPRUS, and PORTUGUESE EAST AFRICA.—Meridian of 30° E., or 2 hours fast of G.M.T.

TURKEY.—Although Central European time for West Turkey and Eastern Europe time for Eastern Turkey has been adopted by the Customs and some public offices, the old Turkish mode of reckoning time is still in general use.

ASCENSION.—Meridian of 14° 15′ W., or 57m. slow of G.M.T.

MAURITIUS, REUNION and SEYCHELLES.—60th meridian, or 4 hours fast of G.M.T.

CHAGOS ISLANDS and PORTUGUESE INDIA.—75th meridian, or 5 hours fast of G.M.T.

INDIA (except CALCUTTA) and CEYLON.—Meridian of 82° 30″ E., or 5½ hours fast of G.M.T.

BURMAH.—Meridian of 97° 30″ E., or 6½ hours fast of G.M.T.

STRAITS SETTLEMENTS, FEDERATED MALAY STATES and FRENCH INDO-CHINA.—Meridian of 105° E., or 7 hours fast of G.M.T.

JAVA.—109° 48′ 37·5″ E., or 7h. 19m. 14·5s. fast of G.M.T.

HONG KONG and EAST COAST OF CHINA, SHANGHAI, KIAU CHAU, PHILIPPINE ISLANDS, BRITISH NORTH BORNEO, LABUAN, WESTERN AUSTRALIA.—Meridian of 120° E., or 8 hours fast of G.M.T.

KOREA.—Meridian of 127° 30′ E., or 8½ hours fast of G.M.T.

JAPAN, SEOUL and CHEMULPO.—Meridian of 135° E., or 9 hours fast of G.M.T.

SOUTH AUSTRALIA and GUAM.—Meridian of 142° 30′ E., or 9½ hours fast of G.M.T.

NEW SOUTH WALES, QUEENSLAND, TASMANIA, VICTORIA, NEW GUINEA, CAROLINE ISLANDS.—Meridian of 150° E., or 10 hours fast of G.M.T.

NEW ZEALAND.—Meridian of 172½° E., or 11½ hours fast of G.M.T.

HAWAII or SANDWICH ISLANDS.—Meridian of 157° 30′ W., or 10½ hours slow of G.M.T.

SAMOA.—Meridian of 172½° W., or 11½ hours slow of G.M.T.

ALASKA.—Meridian of 135° W., or 9 hours slow of G.M.T.

CHILI, PANAMA, PERU.—Meridian of 75° West of Greenwich, or 5 hours slow of G.M.T.

COLOMBIA.—Meridian of Bogota, or 4h. 56m. 52·4s. slow of G.M.T.

ECUADOR.—Meridian of Quito, or 5h. 14m. 06·7s. slow of G.M.T.

COSTA RICA.—Meridian of San José, or 5h. 36m. 16·9s. slow of G.M.T.

NICARAGUA.—Meridian of Managua, or 5h. 45m. 10s. slow of G.M.T.

SALVADOR.—Meridian of San Salvador, or 5h. 56m. 32s. slow of G.M.T.

MEXICO.—Meridian of City of Mexico, or 6h. 36m. 26·7s. slow of G.M.T.

HONDURAS.—Meridian of 90° W., or 6 hours slow of G.M.T.

URUGUAY.—Meridian of Monte Video, or 3h. 44m. 48·9s. slow of G.M.T.

ARGENTINE REPUBLIC.—Meridian of Cordova, 4h. 16m. 48·2s. slow of G.M.T.

BRAZIL.—Meridian of Rio Janeiro, or 2h. 52m. 41·4s. slow of G.M.T.

VENEZUELA.—Meridian of Caracas, or 4h. 30m. slow of G.M.T.

NEW BRUNSWICK, NOVA SCOTIA, PRINCE EDWARD ISLAND, MIQUELON, PORTO RICO, MARTINIQUE, GRENADA, TRINIDAD, TOBAGO, BRITISH and FRENCH GUIANA.—Meridian of 60° W., or 4 hours slow of G.M.T.

CUBA.—Local mean time, and not Standard time of the 75th meridian of W. long., is now in use in Cuba. The time ball in approximately 23° 8′ 27″ N., 82° 20′ 55″ W., at Havana, is dropped at local mean noon, corresponding to 5h. 29m. 23·7s. p.m. G.M.T.

CANADA and the UNITED STATES.—The territories are divided into hourly zones, the Standard times for which are respectively 4, 5, 6, 7, and 8 hours slow of Greenwich, the corresponding meridians being 60°, 75°, 90°, 105°, and 120° W. As a rule the time used in Canada, from the East coast to 67½° W., is 4 hours slow of Greenwich (Intercolonial time); between 67½° and 82½° W., 5 hours slow (Eastern time); between 82½° and 97½° W., 6 hours slow (Central time); between 97½° and 112½° W., 7 hours slow (Mountain time); from 112½° W. to the West coast, 8 hours slow of Greenwich (Pacific time).

BRITISH COLUMBIA.—Meridian of 120° W., or 8 hours slow of G.M.T.

CONCISE TABLES OF CONTINENTAL MONIES.

(Extracted by permission from Bradshaw's Continental Guide.)

(1) A Concise Table of Foreign Monies, Reduced from English into the Currency of Other Countries at Par.

England.			France, Italy, Belgium, Switzerland.		Germany.		Holland.		United States.		Austria in Notes.	Russia in Notes.
£	s.	d.	Frs.	Cts.	Mks.	Pfg.	Fl.	Cts.	Dols.	Cts.	Kronen.	Roubles.
0	0	0½	0	052	0	04	0	02	0	01	·04	·01
0	0	1	0	104	0	08	0	05	0	02	·08	·03
0	0	2	0	208	0	17	0	10	0	04	·18	·07
0	0	3	0	312	0	25	0	15	0	06	·26	·10
0	0	4	0	416	0	33	0	20	0	08	·38	·14
0	0	5	0	520	0	42	0	25	0	10	·48	·18
0	0	6	0	625	0	50	0	30	0	12	·56	·21
0	0	7	0	729	0	58	0	35	0	14	·66	·25
0	0	8	0	833	0	67	0	40	0	16	·76	·28
0	0	9	0	937	0	75	0	45	0	18	·86	·32
0	0	10	1	040	0	84	0	50	0	20	·96	·36
0	0	11	1	144	0	92	0	55	0	23	1·04	·39
0	1	0	1	25	1	0	0	60	0	25	1·20	·47
0	2	0	2	50	2	0	1	20	0	50	2·40	·95
0	3	0	3	75	3	0	1	80	0	75	3·60	1·42
0	4	0	5	0	4	0	2	40	1	0	4·80	1·90
0	5	0	6	25	5	0	3	0	1	25	6·	2·37
0	6	0	7	50	6	0	3	60	1	50	7·20	2·85
0	7	0	8	75	7	0	4	20	1	75	8·40	3·32
0	8	0	10	0	8	0	4	80	2	0	9·60	3·80
0	9	0	11	25	9	0	5	40	2	25	10·80	4·27
0	10	0	12	50	10	0	6	0	2	50	12·	4·75
0	11	0	13	75	11	0	6	60	2	75	13·20	5·22
0	12	0	15	0	12	0	7	20	3	0	14·40	5·70
0	13	0	16	25	13	0	7	80	3	25	15·60	6·17
0	14	0	17	50	14	0	8	40	3	50	16·80	6·65
0	15	0	18	75	15	0	9	0	3	75	18·	7·12
0	16	0	20	0	16	0	9	60	4	0	19·20	7·60
0	17	0	21	25	17	0	10	20	4	25	20·40	8·07
0	18	0	22	50	18	0	10	80	4	50	21·60	8·55
0	19	0	23	75	19	0	11	40	4	75	22·80	9·02
1	0	0	25	0	20	0	12	0	5	0	24·	9·40
2	0	0	50	0	40	0	24	0	10	0	48·	18·80
3	0	0	75	0	60	0	36	0	15	0	72·	28·20
4	0	0	100	0	80	0	48	0	20	0	96·	37·60
5	0	0	125	0	100	0	60	0	25	0	120·	47·
6	0	0	150	0	120	0	72	0	30	0	144·	56·40
7	0	0	175	0	140	0	84	0	35	0	168·	65·80
8	0	0	200	0	160	0	96	0	40	0	192·	75·20
9	0	0	225	0	180	0	108	0	45	0	216·	84·60
10	0	0	250	0	200	0	120	0	50	0	240·	94·

In France, Belgium, Switzerland and Italy, 1 franc = 100 centimes. Germany, 1 mark = 100 pfennig. Holland, 1 florin or gulden = 100 cents. Norway, Sweden, and Denmark, 1 krone = 100 ore. United States, 1 dollar = 100 cents. Spain, 1 peseta = 100 centimos. Austria, 1 krone = 100 heller. Hungary, 1 korona = 100 fillér. Portugal, 1 milreis = 1000 reis. Greece, 1 drachma = 100 leptas. Turkey, 1 piastre = 40 paras. Russia, 1 rouble = 100 kopecks.

In France, Belgium, Switzerland, Italy and Greece, 5 franc pieces are legal tender in each country, irrespective of the country of origin. Smaller Italian coins only pass in their own country; French, Belgian, Swiss and Greek small silver coins pass indiscriminately, but not the copper or nickel centimes.

SPAIN.—The silver and paper currency is depreciated, and is subject to considerable fluctuations in value.

(2) APPROXIMATE VALUES OF GOLD AND SILVER COINS, SUBJECT TO VARIATIONS ACCORDING TO THE FLUCTUATIONS IN THE RATES OF EXCHANGE.

DESCRIPTION OF COIN.	Value in English.			United States.		France, Belgium, Switzerland.		German Empire.		Holland.		Austrian Paper.		Italian	
GOLD.	£	s.	d.	Dl.	Ct.	Fr.	Ct.	M.	Pf.	Gl.	Ct.	Kr.	H.	Lr.	Ct.
English Sovereign ...	1	0	0	4	87	25	24	20	48	12	8	24	15	25	50
Twenty Franc Piece	0	15	10	3	84	20	0	16	13	9	54	19	25	20	0
German 20 Mark Piece	0	19	6	4	74	24	70	20	0	11	77	23	50	24	70
Dutch 10 Florins ...		16	4	3	96	20	80	16	60	10	0	19	80	20	80
Imperial (Russian) ...	0	15	10	3	85	20	0	16	13	9	54	18	70	20	0
Twenty Kroner (Swedish, Norwegian, and Danish)	1	1	9	5	25	27	40	22	20	13	10	24	92	27	40
Half-Eagle (5 dolls. U.S.)	1	0	6	5	0	25	85	20	90	12	38	24	50	25	85
SILVER.															
English Shilling ...	0	1	0	0	24	1	25	1	0	0	60	1	14	1	25
Five Franc Piece ...	0	3	11½	0	95	5	0	4	00	2	37½	4	54	5	0
One Franc Piece ...	0	0	9½	0	19	1	0	0	80	0	47½	0	92	1	0
One Mark	0	0	11¾	0	24	1	22	1	0	0	59	1	12	1	22
One Florin (Dutch)...	0	1	7¾	0	40	2	05	1	70	1	0	1	88	2	05
One Krone (Danish, Swedish, and Norwegian)	0	1	1	0	27	1	30	1	13	0	66	1	24	1	30
One Peseta (Spanish)	0	0	7	0	14	0	70	0	60	0	30	0	70	0	70
One Dollar (U.S.) ...	0	4	1	1	0	5	10	4	10	2	46	4	70	5	10

FOREIGN AND COLONIAL MONIES WITH APPROXIMATE VALUE IN BRITISH CURRENCY.

Argentine Republic.—Gold coin, 5 dollars Silver coins, 1 dollar and 50, 20, and 10 centavos. Bronze coins, 2 and 1 centavos. Nickel coins, 20, 10, and 5 centavos. Silver dollar or peso = 4s. Money in circulation is chiefly paper, being converted at 44 cents gold to dollar = 1s. 9d. Gold dollar = 4s.

Austria-Hungary.—Gold coins, 100 krone = £4 3s. 4d.; 20 krone = 16s. 8d.; 10 krone = 8s. 4d.; Single ducat = 11 crowns 29 heller = 9s. 4¾d. Silver coin, 1 krone = 100 heller = half gulden old coinage = 10d. Exchange about 24 krone to £. Silver gulden or florins (about 12 = £) = 100 kreutzer continue to be legal tender. Nickel, 20 heller = 10 kreutzer of old coinage = 2d., 10 heller = 5 kreutzer of old coinage = 1d. Bronze, 2 heller = 1 kreutzer = ⅕d., 1 heller = ½ kreutzer = $\frac{1}{10}$d.

Australia.—The same as in Great Britain.

Belgium.—The same as France.

Bolivia.—100 centavos = 1 boliviano (paper) = about 1s. 7d., or 12½ bolivianos to £. Coins in circulation are—silver, 50, 30, 20, and 10 centavos; Nickel, 10 and 5 centavos, and English gold coin. Currency principally paper.

Brazil.—Currency paper, worth 1s. 4½d. per milreis (1,000 reis) or nearly 15 milrei = £1. Silver coinage of 2, 1, and ½ milreis pieces in circulation.

British Honduras.—100 centavos = 1 dollar (gold) = 4s. 1½d. British sovereign (= $4·86) and half sovereign, and U.S. gold coins legal. Silver coins—5, 10, 25 and 50 cents legal tender to $10. Bronze—1 cent legal tender to 50 cents.

Bulgaria.—Lev (= franc) = 100 stotinki = 9½d. (stotinka = centime). Gold coins, 10 and 20 leva, but foreign 10 and 20 franc pieces principally in circulation. Silver, ½, 1, 2 and 5 leva. Nickel, 2½, 5, 10, 20 stotinki. Bronze, 1, 2, 5, 10 stotinki.

Canada.—1 cent. = ½d. 100 cents = 1 dollar = about 4s. 1½d. 4 dollars 86⅔ cents = £ sterling. U.S. gold coins also legal.

Chili.—Gold coins, 20 (colon or condor), 10 (doubloon), and 5 (escudo) peso pieces. Silver coins, 1 peso and $\frac{1}{5}$, $\frac{1}{10}$, and $\frac{1}{2}$ of a pesu. Bronze coins, ½, 1, 2 and 2½ centavo pieces. Currency is paper—the peso or dollar = about 10d. The restoration of the gold currency is projected under a currency law which was to take effect on 1st January, 1910, but has been deferred till 1st January, 1915. Gold peso = 1s. 6d. English sovereign has a legal value of 13⅓ pesos gold.

China.—1,220 (about) cash = 1 haikwan (or customs) tael = about 2s. 8¼d. About 35 cash = 1d. A coin recently issued is the "hundredth of a dollar" worth about $\frac{8}{25}$ of 1d. Silver dollar of same value as Japanese silver yen, is also current. At Hong Kong the dollar (1,000 cash) = about 1s. 11d. and at Shanghai about 2s. 8d. In October, 1908, an Imperial Edict decreed the establishment of a uniform Tael currency —unit silver tael to have a value of between 30d. and 40d.

Cochin China.—5 sapéques or cash = 1 cent.; 100 cents. = 1 dollar = about 2s.

Colombia.—100 centavos = 1 peso or dollar gold—nominal value 4s. Gold coins, 1, 2½ and 5 dollars. Silver coins, real, peseta, half-dollar and dollar. Very few coins are in circulation, the currency being principally paper, subject to considerable fluctuation. At the legal rate the paper peso = 1 centavo gold, or \$500 = £1.

Denmark.—100 ore = 1 krone = 1s. 1¼d. 18 kroner 19 ore = £ sterling. Gold coins of 20 kroners and 10 kroners. Silver, 2 kroner (rigsdaler), 1 krone and 25 ore.

Egypt.—97¼ piastres = £ sterling. 100 piastres, or 1,000 milliemes = £ Egyptian (gold) = £1 0s. 6¼d. Gold circulating is almost exclusively English. 10 milliemes = 1 piastre = about 2½d. Gold piece of 20 francs = about 77 piastres. Silver coins, 1, 2, 5, 10 and 20 piastres; legal tender to £E2.

France.—100 centimes = 1 franc = 9½d. 20 franc piece (Louis or Napoleon = 15s. 10d. About 25 france 25 cents. = £ sterling. Gold coins of 5, 10, 20. 50, and 100 francs. Silver coins, 20 centimes, ½, 1, 2, and 5 franc pieces. Nickel coin, 25 centimes. Bronze coins, 1, 2, 5, and 10 centimes.

GERMAN EMPIRE.—100 pfennig = 1 mark = about 1s. About 20·45 m. = £ sterling. Gold coins, 20 (doppel-krone), 10 (krone), and 5 (half-krone) marks. Silver coins, 1, 2, 3, and 5 marks and 50 pfennige. Thaler = 3 marks = 2s. 11d. Nickel coins, 20, 10, and 5 pfennige. Bronze coins, 1 and 2 pfennige.

GREECE.—100 lepta = 1 drachma paper = 9d. 27 drachmæ 30 lepta = £1 or about 108 drachmæ per 100 fcs. Foreign gold coins in circulation.

HOLLAND.—100 cents = 1 guilder or florin = 1s. 8d. 12 guilders 10 cent. = £ sterling. Gold coins, 10 florins (16s.). Silver coins, 2½ guilders (rijksdaaler), 1 guilder, ½ guilder and 25 cents.

INDIA.—£1 = 15 rupees. 16 annas = 1 rupee = 1s. 4d. 3 pie = 1 pice, 12 pie = 1 anna = 1d. Lac of rupees = 100,000. Crore of rupees = 10,000,000.

ITALY.—100 centesimi = 1 lira = 9½d. About 25 lire 40 cents. = £ sterling. Gold coins, 100, 50, 20, 10, and 5 lire. Silver coins, 5, 2, 1 lira, and 50 and 20 centesimi. Paper worth much less.

JAPAN.—10 rin = 1 sen = ¼d., 100 sen = 1 yen or dollar = 2s. 0½d. Gold coins, 5, 10, and 20 yen. Silver coins, 10, 20, and 50 sen. Nickel coin, 5 sen. Bronze coins, 1 sen and 5 rin. The unit of account is the gold yen.

MEXICO.—100 centavos = 1 dollar or peso (silver) = 2s. 0½d.

NORWAY.—100 ore = 1 kroner = 1s. 1¼d. Gold coins, 10 and 20 kroners. Exchange 18·19 krone = £ sterling. Paper money principally used; least value, 5 kroner. Below this amount, silver and copper coins.

PORTUGAL.—100 reis = 1 teston = 4d. 1,000 reis = 1 milreis. Paper milreis = about 4s. 1d. Gold coins, 1, 2, 5, and 10 milreis. Currency, principally paper. Conto = 1,000 milreis. In the Azores, 1 milrei = 3s. 6½d.

ROUMANIA.—1 leu = 100 bani = about 9½d. Gold coins, 5, 10, and 20 lei. Silver, 1 leu, 2 and 5 lei. Nickel, 5, 10 and 20 bani.

RUSSIA.—100 copecks = 1 rouble. Silver or paper rouble = 2s. 1½d. Gold coins—15 roubles (imperial), 10 roubles, 7·50 roubles (half-imperial), 5 roubles. 15 paper roubles = 10 roubles gold = roughly 1 guinea. Currency principally paper.

SERVIA.—Dinar = 1 franc = 9½d. Gold coins, 10 and 20 dinars. Silver, ½, 1, 2, 5 dinars. Bronze, 5 and 10 paras. Nickel, 5, 10, 20 paras.

SPAIN.—100 centimos = 1 peseta—about 26·70 pesetas to the £ sterling. Gold coins are 20, 10 and 5 peseta pieces. Silver coins, 1 and 5 pesetas.

STRAITS SETTLEMENT AND MALAY STATES.—Gold dollar = 2s. 4d. Silver coins—50, 20, 10 and 5 cent pieces—are legal tender to 2 dollars, but ½ dollar is unlimited tender. Copper coins —1, ½ and ¼ cents—are legal tender to 1 dollar.

SWEDEN.—Krona of 100 ore = 1s. 1¼d. or 18·19 kr. to the £1. Gold little used. Currency for 5 kr. or more mostly paper.

TURKEY.—40 paras = 1 piastre = 2¼d. nearly. 100 piastres = 1 lira turca or gold medjidie = 18s. 109½ pias = £1. "Purse," sometimes used in accounts = 500 piastres or 5 liras and is calculated = £4 10s. 0d. Value of piastre varies in different parts of the Turkish Dominions. In Syria, 1 Turkish £ = 130 local piastres and £1. = 143½ local piastres.

UNITED STATES.—1 cent = about ½d., 100 cents = 1 dollar = 4s. 1½d. 4 dols. 87 cents = £ sterling. Gold coins, 2½ dollar piece, half eagle (5 dollars), 1 eagle (10 dollars), 1 double eagle (20 dollars).

URUGUAY.—100 centavos = 1 dollar (gold) = about 4s. 3d., or $4·70 = £. Only foreign gold coins (which are legal tender) are in circulation. Silver coins, 10, 20 and 50 cents. and 1 dollar. Nickel, 1, 2 and 5 cents.

VENEZUELA.—Medio = about 2½d.; real = about 5d. Monetary unit is silver bolivar = about 9½d., or 1 franc, or 25·25 bols. to the £. Exchange fluctuates slightly from the par, but 25·25 bols. to the £ should be taken as a basis. Currency is based on gold standard—no paper in circulation. Coins are gold, silver and nickel, but principal coin is silver dollar of 5 bols. known as "peso fuerte" or simply "fuerte."

THERMOMETRICAL AND BAROMETRICAL TABLE.

THERMOMETERS.

Réaumur.	Centigrade.	Fahrenheit.	
80°	100°	212°	WATER BOILS (when the bar. is at 30 inch = 760 mm.)
76	95	203	
72	90	194	
68	85	185	
64	80	176	
62·7	78·3	173	Alcohol boils (when the bar. is at 30 inch = 760 mm.)
60	75	167	
56	70	158	
52	65	149	
48	60	140	
44	55	131	
43	53	127	Tallow melts.
40	50	122	
36	45	113	
32	40	104	
30·2	37·8	100	Fever heat commences.
29·3	36·7	98	Blood heat.
28	35	95	
24	30	86	
20	25	77	Summer heat.
19	24	76	
16	20	68	
12	15	59	Temperate.
8	10	50	Temperature of spring water.
4	5	41	
0	0	32	WATER FREEZES.
— 4	— 5	23	
— 8	—10	14	
—12	—15	5	
—14·4	—18	0	ZERO (Fahrenheit).

BAROMETER.

Millim.		Inches.
715	=	28·15
720	=	28·35
725	=	28·54
730	=	28·74
735	=	28·94
740	=	29·13
745	=	29·33
750	=	29·53
755	=	29·73
760	=	29·92
765	=	30·12
770	=	30·32
775	=	30·51
780	=	30·71
785	=	30·91
790	=	31·10

Inches.		Millim.
31	=	787·4
30	=	762·0
29	=	736·6
28	=	711·2
27	=	685·8

Intermediate heights, to be added to above.

Millim.		Inches.
1	=	·039
2	=	·079
3	=	·118
4	=	·158
5	=	·197

Inches.		Millim.
0·1	=	2·51
0·2	=	5·1
0·3	=	7·6
0·4	=	10·1
0·5	=	12·7
0·6	=	15·2
0·7	=	17·8
0·8	=	20·3
0·9	=	22·9

BAROMETER.—The weather glass and rainfall in France are measured by the millimètre = 1-1000th of a mètre = ·0394 inches = 4-100th of an inch.

THERMOMETER TABLE.—On the Continent thermometers are frequently graded for both Centigrade and Réaumur.

TEMPERATURE CONVERSION TABLES.

(By permission of the Proprietors of the Electrician.)

FOR CONVERTING TEMPERATURES CENT. TO FAHR.

° C.	° F.	° C.	° F.	° C.	° F.	° C.	° F.
0	+32·0	33	91·4	66	150·8	99	210·2
+1	33·8	34	93·2	67	152·6	100	212·0
2	35·6	35	95·0	68	154·4	105	221·0
3	37·4	36	96·8	69	156·2	110	230·0
4	39·2	37	98·6	70	158·0	115	239·0
5	41·0	38	100·4	71	159·8	120	248·0
6	42·8	39	102·2	72	161·6	125	257·0
7	44·6	40	104·0	73	163·4	130	266·0
8	46·4	41	105·8	74	165·2	135	275·0
9	48·2	42	107·6	75	167·0	140	284·0
10	50·0	43	109·4	76	168·8	145	293·0
11	51·8	44	111·2	77	170·6	150	302·0
12	53·6	45	113·0	78	172·4	155	311·0
13	55·4	46	114·8	79	174·2	160	320·0
14	57·2	47	116·6	80	176·0	165	329·0
15	59·0	48	118·4	81	177·8	170	338·0
16	60·8	49	120·2	82	179·6	175	347·0
17	62·6	50	122·0	83	181·4	180	356·0
18	64·4	51	123·8	84	183·2	185	365·0
19	66·2	52	125·6	85	185·0	190	374·0
20	68·0	53	127·4	86	186·8	195	383·0
21	69·8	54	129·2	87	188·6	200	392·0
22	71·6	55	131·0	88	190·4	210	410·0
23	73·4	56	132·8	89	192·2	220	428·0
24	75·2	57	134·6	90	194·0	230	446·0
25	77·0	58	136·4	91	195·8	240	464·0
26	78·8	59	138·2	92	197·6	250	482·0
27	80·6	60	140·0	93	199·4	260	500·0
28	82·4	61	141·8	94	201·2	270	518·0
29	84·2	62	143·6	95	203·0	280	536·0
30	86·0	63	145·4	96	204·8	290	554·0
31	87·8	64	147·2	97	206·6	300	572·0
32	89·6	65	149·0	98	208·4		

FOR CONVERTING TEMPERATURES FAHR. TO CENT.

° F.	° C.	° F.	° C.	° F.	° C.	° F.	° C.
0	—17·78	31	—0·56	62	16·67	93	33·89
+1	17·23	32	—	63	17·23	94	34·45
2	16·67	33	+0·56	64	17·78	95	35·00
3	16·11	34	1·11	65	18·34	96	35·56
4	15·56	35	1·67	66	18·89	97	36·11
5	15·00	36	2·23	67	19·45	98	36·67
6	14·45	37	2·78	68	20·00	99	37·23
7	13·90	38	3·34	69	20·56	100	37·78
8	13·34	39	3·90	70	21·11	101	38·34
9	12·78	40	4·45	71	21·67	102	38·90
10	12·23	41	5·00	72	22·23	103	39·45
11	11·67	42	5·56	73	22·78	104	40·00
12	11·11	43	6·11	74	23·34	105	40·56
13	10·56	44	6·67	75	23·90	106	41·11
14	10·00	45	7·23	76	24·45	107	41·67
15	9·45	46	7·78	77	25·00	108	42·23
16	8·89	47	8·34	78	25·56	109	42·78
17	8·34	48	8·89	79	26·12	110	43·34
18	7·78	49	9·45	80	26·67	111	43·90
19	7·23	50	10·00	81	27·23	112	44·45
20	6·67	51	10·56	82	27·78	113	45·00
21	6·11	52	11·11	83	28·34	114	45·56
22	5·56	53	11·67	84	28·89	115	46·11
23	5·00	54	12·23	85	29·45	116	46·67
24	4·45	55	12·78	86	30·00	117	47·23
25	3·90	56	13·34	87	30·55	118	47·78
26	3·34	57	13·90	88	31·11	119	48·34
27	2·78	58	14·45	89	31·67	120	48·90
28	2·23	59	15·00	90	32·22	121	49·45
29	1·67	60	15·56	91	32·78	122	50·00
30	1·11	61	16·11	92	33·33	123	50·56

The Wireless Operator on the Lackawanna train.

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Showi

Mi

Na

Lat.	
0°	60·41
1°	60·40
2°	60·37
3°	60·326
4°	60·261
5°	60·177
6°	60·074
7°	59·954
8°	59·814
9°	59·656
10°	59·480
11°	59·285
12°	59·072
13°	58·841
14°	58·592
15°	58·325
16°	58·040
17°	57·737
18°	57·416
19°	57·077
20°	56·72
21°	56·34
22°	55·95

SPHEROIDAL TABLES,

Showing the Length of each Degree of Latitude in Statute Miles, and of Longitude in Minutes of Latitude or Nautical Miles under each Parallel of Latitude.

Latitude.

Length of one Degree in Statute Miles.

Lat.		Lat.		Lat.		Lat.	
0°	68·704	23°	68·810	46°	69·067	69°	69·318
1°	68·704	24°	68·819	47°	69·079	70°	69·326
2°	68·704	25°	68·828	48°	69·092	71°	69·333
3°	68·706	26°	68·838	49°	69·104	72°	69·341
4°	68·707	27°	68·848	50°	69·116	73°	69·348
5°	68·709	28°	68·858	51°	69·128	74°	69·335
6°	68·711	29°	68·868	52°	69·140	75°	69·361
7°	68·714	30°	68·879	53°	69·152	76°	69·367
8°	68·717	31°	68·889	54°	69·164	77°	69·373
9°	68·721	32°	68·900	55°	69·176	78°	69·378
10°	68·725	33°	68·912	56°	69·187	79°	69·383
11°	68·729	34°	68·923	57°	69·198	80°	69·387
12°	68·734	35°	68·934	58°	69·210	81°	69·391
13°	68·739	36°	68·946	59°	69·221	82°	69·395
14°	68·745	37°	68·958	60°	69·231	83°	69·398
15°	68·751	38°	68·970	61°	69·242	84°	69·401
16°	68·757	39°	68·982	62°	69·252	85°	69·403
17°	68·764	40°	68·994	63°	69·263	86°	69·405
18°	68·771	41°	69·006	64°	69·272	87°	69·407
19°	68·778	42°	69·018	65°	69·282	88°	69·408
20°	68·786	43°	69·030	66°	69·291	89°	69·409
21°	68·794	44°	69·042	67°	69·300	90°	69·409
22°	68·801	45°	69·055	68°	69·309		

Longitude.

Length of one Degree in Nautical Miles.

Lat.		Lat.		Lat.		Lat.	
0°	60·410	23°	55·550	46°	41·817	69°	21·521
1°	60·400	24°	55·125	47°	41·050	70°	20·538
2°	60·373	25°	54·684	48°	40·270	71°	19·548
3°	60·326	26°	54·225	49°	39·479	72°	18·553
4°	60·261	27°	53·751	50°	38·676	73°	17·553
5°	60·177	28°	53·259	51°	37·861	74°	16·547
6°	60·074	29°	52·751	52°	37·035	75°	15·536
7°	59·954	30°	52·228	53°	36·198	76°	14·521
8°	59·814	31°	51·688	54°	35·350	77°	13·502
9°	59·656	32°	51·133	55°	34·492	78°	12·478
10°	59·480	33°	50·562	56°	33·623	79°	11·451
11°	59·285	34°	49·976	57°	32·745	80°	10·421
12°	59·072	35°	49·375	58°	31·856	81°	9·388
13°	58·841	36°	48·758	59°	30·958	82°	8·352
14°	58·592	37°	48·127	60°	30·051	83°	7·313
15°	58·325	38°	47·481	61°	29·135	84°	6·272
16°	58·040	39°	46·821	62°	28·211	85°	5·230
17°	57·737	40°	46·146	63°	27·278	86°	4·186
18°	57·416	41°	45·459	64°	26·337	87°	3·140
19°	57·077	42°	44·757	65°	25·388	88°	2·094
20°	56·722	43°	44·042	66°	24·432	89°	1·047
21°	56·348	44°	43·313	67°	23·468	90°	0·0
22°	55·958	45°	42·571	68°	22·498		

CONVERSION TABLES.

(By permission of the Proprietors of the Electrician.)

To reduce	Multiply by
kilometres to miles	·62
kilometres to yards	1100 (1093·6)
metres to yards	1·1
metres to feet	3·3
centimetres to inches	·4
millimetres to inches	·04
millimetres to mils.	40 (39·4)
miles to kilometres	1·6
miles to metres	1609
yards to kilometres	·0009
yards to metres	·9
feet to metres	·3
inches to centimetres	2·54
inches to millimetres	25 (25·4)
mils. to millimetres	·025
sq. metres to sq. yards	1·2
sq. metres to sq. feet	11 (10·76)
sq. centimetres to sq. inches	·155
sq. millimetres to sq. inches	·0015
sq. yards to sq. metres	·83
sq. feet to sq. metres	·09
sq. inches to sq. centimetres	6·45
sq. inches to sq. millimetres	645
cub. metres to cub. yards	1·3
cub. metres to cub. feet	35·3
cub. cms. to cub. inches	·06
cub. yards to cub. metres	·76
cub. feet to cub. metres	·03
cub. inches to cub. cms.	16·4
kilogrammes to tons	·001
kilogrammes to cwt.	·02
kilogrammes to pounds	2·2

To reduce	Multiply by
tons per sq. foot to head of water (metres)	10·7
tons per sq. foot to atmospheres	1·06
lbs. per sq. inch to tons per sq. ft.	·064
lbs. per sq. in. to kilogrammes per sq. cm.	·07
lbs. per sq. inch to grammes per sq. cm.	70·3
lbs. per sq. inch head of water (feet)	2·3
lbs. per sq. inch to head of water (metres)	·7
lbs. per sq. inch to atmospheres	·07
kilogrammes per sq. cm. to tons per sq. foot	·9
kilogrammes per sq. cm. to lbs. per sq. inch	14·2
kilogrammes per sq. mm. to lbs. per sq. inch	1422
grammes per sq. cm. to lbs. per sq. in.	·014
head of water (metres) to tons per sq. foot	·09
head of water (feet) to tons per sq. foot	·027
head of water (metres) to lbs. per sq. inch	1·4
head of water (feet) to lbs. per sq. inch	·43
atmosphere to tons per sq. foot	·94
atmosphere to lbs. per sq. inch	14·7
grains per sq. inch to dynes per sq. cm.	9·8

,,	kilogrammes to ounces	35 (35·3)
,,	grammes to ounces	·035
,,	grammes to grains	15·4
,,	milligrammes to grains	·015
,,	tons to kilogrammes	1000(1016)
,,	cwt. to kilogrammes	50 (50·8)
,,	pounds to kilogrammes	·45
,,	pounds to grammes	453 (453·6)
,,	ounces to grammes	28·35
,,	grains to grammes	·065
,,	grains to milligrammes	65 (64·8)
,,	lbs. avoir. to grains troy	7000
,,	gallons to cub. feet	·16
,,	gallons to cub. metres	·0045
,,	gallons to litres	4·5
,,	gallons of water to lbs.	10
,,	cub. feet to gallons	6·2
,,	cub. metres to gallons	220
,,	litres to gallons	·22
,,	lbs. of water to gallons	·1
,,	litres to cub. feet	·035
,,	litres of water to lbs.	2·2
,,	cub. feet to litres	28·3
,,	lbs. of water to litres	·454
,,	cub. feet of water to lbs.	62·3 (62·27)
,,	lbs. of water to cub. feet	·016
,,	feet per minute to miles per hour	·0113
,,	feet per minute to metres per sec.	·005
,,	miles per hour to feet per minute	88
,,	metres per sec. to feet per minute	197
,,	tons per sq. foot to kilogrammes per sq. cm.	1·09
,,	tons per sq. foot to lbs. per sq. in.	15·5
,,	tons per sq. foot to head of water (feet)	36

,,	dynes per sq. cm. to grains per sq. inch	0·1
,,	carcels to candles	9·8
,,	candles to carcels	10·2
,,	English candles to German	1·1
,,	German candles to English	·92
,,	*joules to ergs	10
,,	joules to foot lbs.	·737
,,	joules to kilogrammetres	·1
,,	joules to lbs. deg. F.	·0095
,,	joules to calories	·24
,,	calories to joules	4·2 (4·158)
,,	lbs. deg. F. to joules	1048
,,	kilogrammetres to joules	9·8
,,	foot lbs. to joules	1·35
,,	lbs. deg. F. to foot lbs.	772·
,,	lbs. deg. F. to kilogrammetres	107·
,,	lbs. deg. F. to calories	252·
,,	calories to lbs. deg. F.	·004
,,	kilogrammetres to lbs. deg. F.	·009
,,	kilogrammetres to calories	2·34
,,	kilogrammetres to foot lbs.	7·2
,,	foot lbs. to kilogrammetres	·14
,,	calories to kilogrammetres	·42
,,	H. P. to watts	746
,,	H. P. to foot lbs. per minute	33000
,,	H. P. to kilogrammetres per sec.	76
,,	watts to foot lbs. per minute	44
,,	watts to kilogrammetres per sec.	·1
,,	centimes per car-kilometre to pence per car-mile	·16
,,	pence per car-mile to centimes per car-kilometre	·2

* One *joule* = one *watt second*.

SYNOPSIS OF UNITS.

		Dimensions
I.—Fundamental.		
Length—Mass—Time	...	L—M—T
II.—Derived Mechanical.		
Area	$=L \times L$	L^2
Volume	$=L \times L \times L$	L^3
Velocity	$V=L \div T$	LT^{-1}
Momentum	$=$ mass $\times$ velocity	$L\,M\,T^{-1}$
Acceleration	$A=$ velocity $\div$ time	LT^{-2}
Force	$F=$ mass $\times$ acceleration	$L\,M\,T^{-2}$
Work	$W=$ force $\times$ length	$L^2\,M\,T^{-2}$
Energy (kinetic)	$=\frac{1}{2}$ mass $\times$ velocity^2	$L^2\,M\,T^{-2}$
III.—Derived Electro-Static.		
Quantity	$q=vQ=\sqrt{\text{force} \times \text{distance}^2}$	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Current	$c=vI=$ quantity $\div$ time	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-2}$
Electro-motive Force / Difference of Potential	$e=\frac{E}{v}=$ work $\div$ quantity	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Resistance	$r=\frac{R}{v^2}=$ electro-motive force $\div$ current	$L^{-1}\,T$
Capacity	$k=v^2K=$ quantity $\div$ electro-motive force	L
Sp. Ind. Capacity	$=$ quantity $\div$ another quantity	a numeral
IV.—Derived Magnetic.		
Strength of Pole / Quantity of Magnetism	$m=\sqrt{\text{force} \times \text{distance}^2}$	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Moment of a Magnet	$ml=$ strength of pole $\times$ length of poles	$L^{\frac{5}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Intensity of Magnetisation	$I=$ moment of magnet $\div$ volume	$L^{-\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Magnetic Potential	$=$ work $\div$ strength of pole	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
V.—Derived Electro-Magnetic.		
Current	$C=\frac{c}{v}=$ intensity of field $\times$ length	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Quantity	$Q=\frac{q}{v}=$ current $\times$ time $=CT$	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}$
Electro-motive Force / Difference of Potential	$E=ev=$ work $\div$ quantity	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-2}$
Resistance	$R=rv^2=$ electro-motive force $\div$ current	$L\,T^{-1}$
Capacity	$K=\frac{k}{v^2}=$ quantity $\div$ electro-motive force	$L^{-1}\,T^2$
Sp. Ind. Capacity	$=$ displacement $\div$ force	$L^{-2}\,T^2$
Self-induction, or "Quadrant"	$L_s=\frac{ET}{C}=\frac{\text{energy}}{C^2}=\frac{H \times (\text{length})^2}{C}$	L
Ratio of electro-magnetic to electro-static unit of quantity, $v=3 \times 10^{10}$ centimetres per second approximately.		$L\,T^{-1}$

INTERNATIONAL SYMBOLS.

(*The symbols given on p. 662 have been taken by special permission from the report of the International Electrotechnical Commission. Copies of this report may be obtained from the General Secretary, 28, Victoria Street, London, S.W.*)

RULES FOR QUANTITIES.

(*a*) Instantaneous values of electrical quantities which vary with the time to be represented by small letters. In case of ambiguity, they may be followed by the subscript "t."

(*b*) Virtual or constant values of electrical quantities to be represented by capital letters.

(*c*) Maximum values of periodic electrical and magnetic quantities to be represented by capital letters followed by the subscript "m."

(*d*) In cases where it is desirable to distinguish between magnetic and electric quantities, constant or variable, magnetic quantities to be represented by capital letters of either script, heavy-faced or any special type. Script letters to be only employed for magnetic quantities.

(*e*) Angles to be represented by small Greek letters.

(*f*) Dimensionless and specific quantities to be represented, wherever possible, by small Greek letters.

The I.E.C. will recommend to the International Congress of the Applications of Electricity, to be held in San Francisco in 1915, the adoption of the name "Siemens" for the unit of conductance, denoted by G.

RULES FOR QUANTITIES—*continued.*

Name of Quantity	Symbol	Symbols recommended for the case in which the principal symbol is not suitable
1. Length	l	In dimensional equations the capital letters, L, M, T, are to be employed.
2. Mass	m	
3. Time	t	
4. Angles	$\alpha, \beta, \gamma \ldots$	
5. Acceleration of gravity ...	g	
6. Work	A	W
7. Energy	W	U
8. Power	P	*
9. Efficiency	η	
10. Number of turns in unit of time	n	
13. Period	T	
14. $2\pi/T$	ω	
15. Frequency	f	ν †
15. Phase displacement ...	ϕ	
17. Electromotive force ...	E	
18. Current	I	
19. Resistance	R	
20. Resistivity	ρ	
22. Quantity of electricity ...	Q	
23. Flux-density, electrostatic	D	
24. Capacity	C	
25. Dielectric constant	ϵ	
26. Self-inductance	L	$\mathfrak{L}$
27. Mutual inductance	M	$\mathfrak{M}$
28. Reactance	X	$\mathfrak{X}$
29. Impedance	Z	$\mathfrak{Z}$
30. Reluctance	S	$\mathfrak{R}$ Script, heavy-faced, or special type.
31. Magnetic flux	Φ	$\mathfrak{F}$
32. Flux-density, magnetic ...	B	$\mathfrak{B}$
33. Magnetic field	H	$\mathfrak{H}$
34. Intensity of Magnetisation	J	$\mathfrak{J}$
35. Permeability	μ	
36. Susceptibility	κ	

* A symbol for the second column is to be supplied by the Austrian and German Committees jointly and inserted without further discussion by the I.E.C.

† This symbol will be omitted if the Austrian and German Committees agree to do so.

The symbols 13, 14, 20, 23, 25, 27 to 31 are not so far accepted in Germany.

SYNOPSIS OF PRACTICAL UNITS.

(Symbols to be employed only after numerical values.)

Unit.	Symbol.	Name.	Derivation.	Value. C.G.S.	Value. Equivalent.
E. M. F.	V	Volt.	Ampere × ohm.	10^8	·926 standard Daniell cell, or ·697 standard Clark cell
Resistance	O or Ω*	Ohm.	Absolute.	10^9	106·3 c.m. mercury, 1 sq. mm. section (14·4521 grm.) at 0°C.
Current	A	Ampere.	Absolute.	10^{-1}	1·118 milligrammes of silver deposited per second
Quantity	Q	Coulomb.	Ampere × second	10^{-1}	
Capacity	F	Farad.	Coulomb ÷ volt	10^{-9}	
,,		Microfarad.	1 millionth farad.	10^{-15}	2·5 nauts of D. U. S. cable
Power	W	Watt.	Volt × ampere	10^7	·0013405 or $\frac{1}{746}$ h.-p.
Work	J	Joule.	Volt × coulomb.	,,	·7373 ft.-lbs.
Heat	J	Joule.	Amp.^{2} × sec. × ohm.	,,	·238 calorie.
Self-induction	H	Henry	Volt × second ÷ ampere.	10^9	Electro-magnetic energy stored in the system

* Provisional.

The compound units are Volt Coulomb (VC), Watt-hour (WH), Volt-ampere (VA), Ampere-hour (AH), Milliampere (MA), Kilowatt (KW), Kilo-volt-ampere (KVA), Kilowatt-hour (KWH).

PRACTICAL ELECTRIC UNITS.

RESISTANCE, R.—The OHM is equal to 10^9 C.G.S.* units of resistance. It has been agreed to take as the practical unit of resistance the resistance of a specified column of mercury (B.A. Committee on Electrical Standards, 1892; Report of Electrical Standards Committee of the Board of Trade, October 27th, 1892). This specified column of uniform cross-section is defined by its length, 106·3 cm. at 0° C., and its mass, 14·4521 grammes. If the mass of 1 cc. of water at 4° C. be 1 gramme, the area of the cross-section of such a column will be 1 sq. mm. Thus 1 ohm is the resistance of a column of mercury at 0° C. 14·4521 grammes in mass, and 106·3 cm. in length. For industrial purposes standards in solid metal having the same resistance as this specified column are made and deposited at the Board of Trade and elsewhere. These standards are from time to time compared together, and have their values redetermined in terms of a mercury column.

To obtain the relation between resistances measured in B.A. units, and resistances measured in ohms, we have—

1 B.A. unit = ·9866 ohm.
1 ohm = 1·01358 B.A. Units.

* Electro-magnetic system.

Thus, to reduce B.A. units to ohms, we have to multiply by ·9866 (*i.e.*, deduct 1·34 per cent.). German silver coils having a temperature coefficient of resistance of ·044 per cent. per 1° C., adjusted to be B.A. units at 0° C., become ohms at 30°·5 C. Platinum silver coils, having a temperature coefficient of ·028 per cent. per 1° C., adjusted to be B.A. units at 0°, become ohms at 47°·8 C.

The MEGOHM = one million ohms.

The MICROHM = one millionth ohm.

The *Specific Resistance of Mercury* is thus $·9407 \times 10^{-4}$ ohms = 94·07 microhms.

The *Legal Ohm* of the Paris Congress, April, 1884, now superseded by the above B.O.T. ohm, is defined as the resistance of a column of mercury 106 cm. long, and 1 sq. mm. section at 0° C.

ELECTRO-MOTIVE FORCE, E.—The VOLT is equal to 10^8 C.G.S.* units of electro-motive force. The E.M.F. of a Clark cell at 15° C. is 1·434 volts. (See *B.O.T. Report.*) Electromotive force is equivalent to the difference of potential between two points. The VOLT is the electro-motive force which maintains a current of 1 ampere in a conductor whose resistance is the ohm.

CURRENT, I.—The AMPERE is the current, of which the absolute measurement is 10^{-1} C.G.S.* units.

One ampere decomposes ·00009324 gramme of water (H_2O) per second, or deposits 1·118 milligrms. of silver per sec. = 4·025 grms. per hour.

The MILLIAMPERE = $\frac{1}{1000}$ of an ampere.

QUANTITY, Q.—The COULOMB is equal to 10^{-1} C.G.S.* units of quantity. It is the quantity of electricity conveyed by an ampere in a second.

CAPACITY, K.—The FARAD is equal to 10^{-9} C.G.S.* units of capacity. It is the capacity defined by the condition that a coulomb charges it to the potential of a volt.

The MICROFARAD, *mfd.* = 10^{-15} C.G.S.* units of capacity, or one-millionth of a Farad.

SELF-INDUCTION, L_s.—The SECOHM,† Quadrant or Henry is equal to 10^9 centimetres or earth's quadrant.

POWER, P_w.—The WATT is equal to 10^7 C.G.S.* units of power. It is the power conveyed by a current of an ampere

* Electro-magnetic system.

† The "secohm" and "quadrant" were the terms used for self-induction until the "Henry" was officially adopted.

through a conductor whose ends differ in potential by a volt; or, in other words, the rate of doing work when an ampere passes through an ohm, and it is equal to 10^7 ergs per second, or a Joule per second ($\frac{1}{746}$ of a H.P.).

$$\therefore\ E \times I = I^2 \times R = E^2 \div R = \text{Watts},$$

$$\text{and} \frac{E \times I}{746} = \frac{I^2 \times R}{746} = \frac{E^2}{746\,R} = \text{Horse-power.}$$

The *Board of Trade Commercial Unit* is 1,000 volt-ampere-hours or 1,000 Watt-hours; 10 ampères at 100 volts an hour = one B.T. unit, or equal to 1·34 H.P. working for one hour.

HEAT OR WORK, W_J.—The JOULE is equal to 10^7 C.G.S.* units of work or ergs. It is the work done, or heat generated by a Watt in a second—*i.e.*, the work done or heat generated in a second by an ampere flowing through the resistance of an ohm, or the heat generated by a Coulomb running down through a difference of potential of 1 volt. It is therefore the amount of heat equivalent to 10^7 ergs. Assuming Joule's equivalent = 41,890,000 ergs, it is the heat necessary to raise ·24 gramme of water 1° C.

$$\therefore\ E\ I\ T = I^2\ R\ T = E^2\ T \div R = E\ Q \text{ Joules.}$$

And since 1 H.P. = 550 ft.-lbs. per second,

$$W = \tfrac{550}{746}\ E\ Q = {\cdot}7373\ E\ Q \text{ ft.-lb.}$$

HEAT UNITS.

HEAT UNITS.—The French unit of heat is the quantity of heat required to raise 1 gramme mass of water, from 4° (temperature of maximum density) to 5° Cent. = 1 gramme degree Cent. = ·00397 British heat unit. The kilogramme degree Cent. in engineering is called the CALORIE. It is = 3·968 British units of heat (B.Th.U.).

The BRITISH THERMAL UNIT is the amount of heat required to raise 1 pound of water, from 60° Fah. to 61° = 1 pound degree Fah. = 0·2519 calories.

JOULE'S EQUIVALENT,* J, is the amount of ENERGY equivalent to a UNIT OF HEAT. Then, for

1 g.-deg. Cent., $J = 41{\cdot}89 \times 10^6$, say 42×10^6 ergs.
1 Calorie $J = 41{\cdot}89 \times 10^9$, say 42×10^9 ergs.
1 lb.-deg. Cent., $J = 1{\cdot}92 \times 10^{10}$ ergs, or 1,400 ft.-lbs.
1 lb.-deg. Fah., $J = 1{\cdot}07 \times 10^{10}$ ergs, or 778 ft.-lbs.

* See *Science Abstracts,* vol. ii., p. 611, for Rowland's, Griffith's, Schuster's, or the latest values for J.

THE HEAT GENERATED in time, T, by a current, I, through a wire of resistance, R, is

$$\frac{I^2 R T}{J} \quad \frac{E I T}{J}$$

where $J = 42 \times 10^6$ and I, R, and E are expressed either in absolute electro-magnetic or electro-static units, and T in seconds.

For practical use, when I is amperes, R ohms, E volts, and T secs., the heat generated in time $T = I^2 R T \times 0{\cdot}24$; or $0{\cdot}24$ E I T calories. Or, ·0009 E I T British units.

RELATION BETWEEN SPARKING DISTANCES AND IMPRESSED VOLTAGE.

In the Standardisation Rules of the American Institute of Electrical Engineers, the following table of sparking distances in air between opposed sharp needle points for various effective sinusoidal voltages is given :—

Kilovolts sq. root of mean sq.	Inches sparking distance.	Kilovolts sq. root of mean sq.	Inches sparking distance.	Kilovolts sq. root of mean sq.	Inches sparking distance.
5	0·225	80	7·1	200	20·25
10	0·47	90	8·35	210	21·30
15	0·725	100	9·6	220	22·35
20	1·0	110	10·75	230	23·40
25	1·3	120	11·85	240	24·45
30	1·625	130	12·90	250	25·50
35	2·0	140	13·95	260	26·50
40	2·45	150	15·0	270	27·50
45	2·95	160	16·5	280	28·50
50	3·55	170	17·10	290	29·50
60	4·65	180	18·15	300	30·50
70	5·85	190	19·20		

Recent tests show that needle-point gaps are not reliable above 100,000 volts. A sphere gap voltmeter is recommended by S. W. Farnsworth and C. L. Fortescue (Proc. Am. Inst. E.E., Feb., 1913), and the tests made by the latter and L. W. Chubb give the following results :—

Diam. of Spheres in C.M.	Gap in C.M.	Volts.
25	2	60,000
25	4	112,000
25	6	165,000
50	8	215,000
50	10	260,000
50	14	350,000

SPECIFIC INDUCTIVE CAPACITIES.

(By permission of the Proprietors of the Electrician.)

The *specific inductive capacity* of a substance is the ratio of the capacity of a condenser when the plates are separated by this substance to the capacity of the same condenser when its plates are separated by air at about 760 mm. pressure—no change being made in the condenser except in the substitution of air for the substance in question.

The determination of the specific inductive capacity of a substance does not admit of great accuracy on account of the phenomenon of absorption or soaking in of the charge which causes an apparent diminution * in the specific inductive capacity for charges of short duration as compared with those of long duration. The figures given in the following table should, therefore, only be regarded as approximately correct.

Substance.	Specific Inductive Capacity.	Authority.
Flint glass, very light, density 2·87	6·61	J. Hopkinson
„ light, density 3·2	6·72	J. Hopkinson
„ „	3·01	Wüllner
„ dense, density 3·66	7·38	J. Hopkinson
„ „	3·05	Wüllner
„ extra dense, density 4·5	9·90	J. Hopkinson
„ extra dense	3·16	Wüllner
Crown glass, hard, density 2·485	6·96	J. Hopkinson
„	3·11	Wüllner
Plate glass	8·45	J. Hopkinson
„ „	5·83 to 6·34	Wüllner
White mirror glass	5·83	Schiller
„ „	6·34	Siemens
Straw-coloured glass	2·96 to 3·66	Schiller
„ „	4·12	Siemens
Paraffin wax	1·977	Gibson & Barclay
„ „	1·96	Wüllner
„ „	2·32	Boltzman
„ „	1·68 to 1·92	Schiller
„ „	2·19 to 2·34	Siemens
Indiarubber, pure	2·12	Schiller
„ „	2·34	Siemens
„ vulcanised	2·69	Schiller
„ „	2·94	Siemens
Resin	2·55	Boltzman
Ebonite	2·21 to 2·76	Schiller
„	3·15	Boltzman
„	2·56	Wüllner
„	2·28	Gordon
Sulphur	2·88 to 3·21	Wüllner
„	3·84	Boltzman
„	2·58	Gordon
Shellac	2·74	Gordon
„	2·95 to 3·73	Wüllner
„	3·15	Boltzman
Gutta-percha	4·2	Faraday
„	2·46	Gordon
Mica	5·0	Faraday
Pitch	1·8	Faraday
Petroleum, spirit, Field's	1·92	J. Hopkinson
„ essence of	2·17	Perot
„ oil, Field's	2·07	J. Hopkinson
„ „ common	2·10	J. Hopkinson
„ „	2·04 to 2·07	Silow
„ „ neutral at 21° C.	2·26	E. B. Rosa
Turpentine, commercial	2·23	J. Hopkinson
„ „ at 18·6° C.	2·43	E. B. Rosa
„ oil of, at 17·1° C.	1·94	Quincke
„ „	2·16 to 2·22	Silow
Castor oil	4·78	J. Hopkinson
Sperm oil	3·02	J. Hopkinson
„ at 20° C.	3·09	E. B. Rosa
Benzine	2·20	Silow
„	2·24	Perot
„ at 21° C.	2·45	E. B. Rosa
Bisulphide of carbon at about 11° C.	1·97 to 2·22	Quincke
„ „ „	1·81	Gordon
Water at 14° C	83·8	Tereschin
„ 25° C.	75·7	E. B. Rosa
Air at about 0·001 mm. pressure	0·94	Ayrton
„ „ 5 mm.	0·9985	Ayrton
„ „ „ „	0·9994	Boltzman
Hydrogen at about 760 mm. pressure	0·9997	Boltzman
„ „ „ „	0·9998	Ayrton
Carbon dioxide at about 560 mm. pressure	1·0004	Boltzman
„ „ „ „ „ „	1·0008	Ayrton
Olefiant gas at about 760 mm. pressure	1·0007	Boltzman
Sulphur dioxide at about 760 mm. pressure	1·0037	Ayrton

* According to M. Perot the reverse is sometimes the case with impure liquids.

SPECIFIC ELECTRICAL RESISTANCE TABLE.

METALS, ALLOYS, ELECTROLYTES, INSULATORS.

(By permission of the Proprietors of the Electrician.)

Metals and Alloys.

Metal or Alloy.	Resistance Compared with Copper (approx.)	Specific Resistance in C.G.S. Units at 0° C.	Temperature Coefficient per 1° C.
Aluminium, annealed	2	2,946	0·0039
,, hard-drawn... ...	2	3,160	0·0039
Antimony, pressed	22½	35,900	0·0039
Bismuth, pressed...	83	132,650	0·0054
Cadmium	6½	6,800	—
Carbon, retort	42,000	67×10^6	—
,, arc light (Carré) ...	4,400	7×10^6	—0·0005
,, glow lamp (Edison-Swan)	2,500	4×10^6	—0·00054
Copper, soft	1	1,580	0·00388
,, hard	1	1,616	0·00388
German silver (Cu 4 parts, Ni 2 parts, Zn 1 part)	13½	21,170	0·00044
Gold, purest soft	1¼	1,952	0·00336
,, hard-drawn	1⅓	2,118	0·00365
Iron	6	9,611	0·0048
Lead, pressed	12½	19,850	0·00387
Lead peroxide, chemically prepared	4×10^6	5590×10^6	—*
Lead peroxide, electrolytically prepared	4×10^6	6780×10^6	—*
Mercury, liquid	59	94,070	0·00072
Manganin (Cu 84 per cent., Mn 12 per cent., Ni 4 per cent.)	26	42,000	0° to 10° C. = +0·000025 10° to 20° C. = +0·000014 20° to 30° C. = +0·000003 30° to 40° C. = 0 40° to 50° C. = —0·000003 50° to 60° C. = —0·000006
Manganese copper (Cu 70 per cent., Mn 30 per cent.)	63	100,600	0·00004
Nickel, pure	7¾	12,290	0·0048
Platinum, pure annealed ...	5	8,222	0·0032
Platinoid (German silver + 1 or 2 per cent. of Tungsten)	27½	43,600	0·00025
Platinum iridium (Pt = 80 per cent., Ir = 20 per cent.)	18½	29,375	0·00089
Platinum silver (Pt = 33 per cent., Ag = 66 per cent.)	16⅔	26,820	0·00018
Phosphor bronze, commercial ...	5⅓	8,479	0·00064
Silver, annealed	—	1,521	0·00377
,, hard-drawn	—	1,652	—
Tin, pure	6	9,565	0·004
,, pressed	8½	13,360	0·0036
Zinc, pressed	3⅔	5,690	0·0036

* John Shields, *Chem. News*, "No alteration observed on heating up to 115° C."

TABLE SHOWING RELATIVE VALUES OF STANDARD, BIRMINGHAM AND AMERICAN (BROWN & SHARPE) WIRE GAUGES.

Reprinted by permission from the "Engineer's Year Book of Formula, Rules, Tables, Data and Memoranda" for 1913 by H. R. Kempe, M.Inst.C.E. Published by Crosby Lockwood & Son.

S.W.G.	B.W.G.	A.W.G.	Equivalent in Mils.	Equivalent in Mms.	S.W.G.	B.W.G.	A.W.G.	Equivalent in Mils.	Equivalent in Mms.
7/0			500	12·699	15	15	13	072	1·828
6/0			464	11·785		16		065	1·650
		0000	460	11·683	16		14	064	1·625
	0000		454	11·531		17		058	1·472
5/0			432	10·972			15	057	1·447
	000		425	10·794	17			056	1·421
		000	409	10·388			16	050	1·270
0000			400	10·159		18		049	1·244
	00		380	9·651	18			048	1·218
000			372	9·448			17	045	1·142
		00	365	9·271		19		042	1·066
00			348	8·839	19		18	040	1·016
	0		340	8·635	20		19	036	9140
		0	325	8·254		20		035	8886
0			324	8·229	21	21	20	032	8124
1	1		300	7·620		22		030	7617
		1	289	7·340			21	0284	7213
	2		284	7·213	22			028	7109
2			276	7·010			22	0253	6126
	3		259	6·578		23		025	6347
		2	257	6·527	23			024	6093
3			252	6·400	24	24	23	022	5585
	4		238	6·045	25	25	24	020	5078
4			232	5·892	26	26	25	018	4570
		3	229	5·816	27	27	26	016	4062
	5		220	5·588	28	28	27	014	3555
5			212	5·384	29	29		013	3300
		4	204	5·181			28	0122	3100
	6		203	5·156	30	30		012	3046
6			192	4·876	31		29	011	2800
		5	182	4·622	32			0108	2743
	7		180	4·571	33	31	30	010	2539
7			176	4·470	34	32	31	009	2300
	8		165	4·191	35	33	32	008	2031
		6	162	4·114	36	34	33	007	1777
8			160	4·064	37			0068	1727
	9		148	3·759	38		34	006	1523
9		7	144	3·657			35	0056	1422
	10		134	3·403	39	35	36	005	1269
10		8	128	3·251	40			0048	1219
	11		120	3·047	41		37	0044	1118
11			116	2·946	42	36	38	004	1015
		9	114	2·895	43		39	0036	0914
	12		109	2·768	44		40	0032	0813
12			104	2·641	45			0028	0713
		10	102	2·590	46			0024	0610
	13		095	2·412	47			002	0507
13			092	2·336	48			0016	0406
		11	090	2·286	49			0012	0305
	14		083	2·108	50			001	0253
14		12	080	2·032					

GILBERT'S TABLE (Ordinary Catenary).

$x = 100 =$ half span.

c = Modulus.	d = dip.	s = length of wire.	l = ordinate at insulator.	90°—i°.		
				°	′	″
2000	2·500511	100·041474	2002·500511	87	8	11
1950	2·564593	100·042440	1952·564593	87	3	46
1900	2·632163	100·045727	1902·632163	86	59	8
1850	2·703298	100·047540	1852·703298	86	54	15
1800	2·778421	100·050163	1802·778421	86	49	6
1750	2·857914	100·054318	1752·857914	86	43	40
1700	2·942018	100·057566	1702·942018	86	37	53
1650	3·031204	100·060788	1653·031204	86	31	46
1600	3·125974	100·064421	1603·125974	86	25	16
1550	3·226852	100·068245	1553·226852	86	18	21
1500	3·334558	100·073939	1503·334558	86	10	59
1450	3·449618	100·078929	1453·449618	86	3	6
1400	3·572907	100·084490	1403·572907	85	54	39
1350	3·705344	100·090750	1353·705344	85	45	35
1300	3·847958	100·097440	1303·847958	85	35	45
1250	4·002035	100·105463	1254·002035	85	25	16
1200	4·168981	100·114680	1204·168981	85	13	51
1150	4·350543	100·125801	1154·350543	85	1	26
1100	4·548545	100·137346	1104·548545	84	47	54
1050	4·765440	100·150553	1054·765440	84	33	5
1000	5·004084	100·165906	1005·004084	84	16	48
980	5·106408	100·173025	985·106408	84	9	49
960	5·213007	100·180582	965·213007	84	2	13
940	5·324098	100·188974	945·324098	83	54	58
920	5·440045	100·196191	925·440045	83	47	4
900	5·561266	100·205825	905·561266	83	38	48
880	5·687876	100·214837	885·687876	83	30	11
860	5·820479	100·225255	865·820479	83	21	9
840	5·959364	100·235949	845·959364	83	11	42
820	6·105033	100·247321	826·105038	83	1	47
800	6·258102	100·260296	806·258102	82	51	23
780	6·418938	100·273356	786·418938	82	40	28
760	6·588360	100·288153	766·588360	82	28	57
740	6·767004	100·304328	746·767004	82	16	50
720	6·955577	100·321527	726·955577	82	4	3
700	7·154926	100·339869	707·154926	81	50	33
680	7·366193	100·360765	687·366193	81	36	15
660	7·590181	100·382517	667·590181	81	21	6
640	7·828368	100·407143	647·828368	81	5	1
620	8·081923	100·433570	628·081923	80	47	54
600	8·352608	100·463404	608·352608	80	29	40
580	8·642033	100·495985	588·642033	80	10	11
560	8·952299	100·532176	568·952299	79	49	27
540	9·283888	100·562366	549·283888	79	27	2
520	9·645021	100·617335	529·645021	79	2	56
500	10·033315	100·667683	510·033315	78	36	59
480	10·454508	100·725490	490·454508	78	8	55
460	10·912412	100·789382	470·912412	77	38	28
440	11·412622	100·863052	451·412622	77	5	23
420	11·961025	100·947150	431·961025	76	29	6
400	12·565207	101·044792	412·565207	75	49	22
380	13·233994	101·158163	393·233994	75	5	35
360	13·978365	101·290757	373·978365	74	17	7
340	14·812141	101·447796	354·812141	73	32	10
320	15·752501	101·635337	335·752501	72	22	46
300	16·821529	101·862069	316·821529	71	14	44
280	18·047685	102·139232	298·047685	69	57	31
260	19·468993	102·483745	279·468993	68	29	13
240	21·126437	102·893226	261·126437	66	47	38
220	23·118850	103·473548	243·118850	64	48	38
200	25·525175	104·219022	225·525175	62	28	34
180	28·559946	105·343499	208·559946	59	39	43
160	32·280531	106·638654	192·280531	56	19	0
140	37·258541	108·722538	177·258541	52	10	2
120	44·134402	111·982596	164·134402	46	58	48
100	54·308027	117·520071	154·308027	40	23	42
95	57·674415	119·517684	152·674415	38	28	45
90	61·511583	121·884206	151·511583	36	26	34
85	65·852160	124·624934	150·852160	34	17	44
80	74·073875	128·153485	151·073875	31	58	28
75	77·147407	132·377616	152·147407	29	32	4
70	84·433443	137·657866	154·433443	26	57	10

Explanatory example of the use of table on p. 670.

Let the distance between the points of support be 2,000 ft. Then x, the half-span, is 1,000 ft. In the table x is represented by 100; therefore every unit in the table represents 10 ft.

Let the required sag be 30 ft., or 3 units of dip. The nearest to this in column 2 is $d = 3{\cdot}031$.

In column 5 we find that the angle which the catenary will make with the vertical through the point of support is $86^{\circ}\ 31'\ 46''$.

In column 3 we find that the actual length of the catenary will be 100·060788 units, or 1000·61 ft.

In column 1 we find that the modulus c is 1,650. This modulus multiplied by the weight per unit length gives the tension at the lowest (mid-) point.

Thus if the wire forming the catenary weighs 100 lbs. per 1,000 yards, or 1-30 lb. per foot, the weight per unit of the table is $\frac{1}{3}$ lb., and the tension at the lowest point will be $1{,}650 + \frac{1}{3}$, or 550 lbs., due to weight of wire alone.

The tension at the point of suspension is found by adding to this mid-point tension the product of the sag in feet into the weight of wire per foot; that is, in this case, by adding 1 lb.

THE GREEK ALPHABET.

Large	Small	Name	Commonly used to designate
Α	α	alpha . .	angles, coefficients.
Β	β	beta . .	angles, coefficients.
Γ	γ	gamma .	specific gravity.
Δ	δ	delta . .	density, variation.
Ε	ε	epsilon. .	base of hyperbolic logarithms.
Ζ	ζ	zeta . .	co-ordinates, coefficients.
Η	η	eta . .	hysteresis (Steinmetz) coefficient, efficiency
Θ	θ	theta . .	angular phase displacement.
Ι	ι	iota . .	
Κ	κ	kappa . .	dielectric constant.
Λ	λ	lambda .	conductivity.
Μ	μ	mu . .	permeability.
Ν	ν	nu . .	reluctivity.
Ξ	ξ	xi . .	output coefficient.
Ο	ο	omricron .	
Π	π	pi . .	circumference—radius.
Ρ	ρ	rho . .	resistivity.
Σ	σ	sigma . .	(cap.), summation ; (small), slip.
Τ	τ	tau . .	time phase displacement.
Υ	υ	upsilon .	leakage coefficient.
Φ	φ	phi . .	flux.
Χ	χ	chi . .	
Ψ	ψ	psi . .	
Ω	ω	omega .	(cap.), ohm ; (small), angular velocity.

WIRELESS TELEGRAPH PATENTS

By J. St. Vincent Pletts.

IN the 1913 edition of the Year Book of Wireless Telegraphy and Telephony curves were published showing in graphical form the development of Wireless Telegraphy as contained in the records at the Patent Office. These curves and their explanatory notes have been brought up to date.

Figure 1 shows the total number of patents accepted and still in force from 1896 until the end of 1913. It will be seen that three years of infancy was followed by nine years of rapid growth,

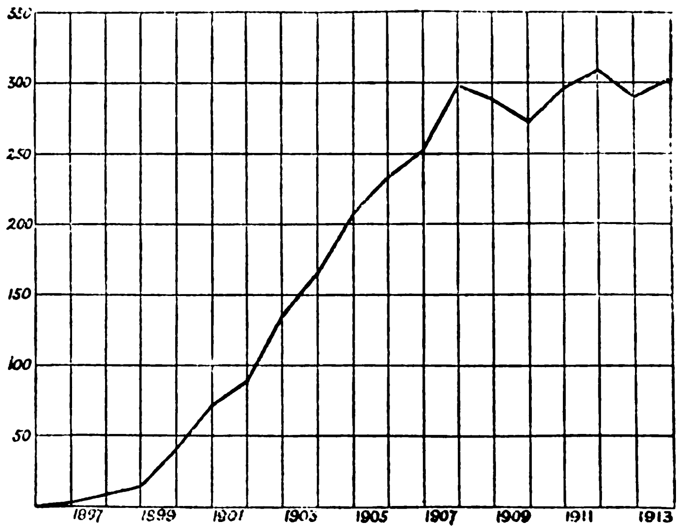

Fig. 1.

which has in turn been followed by a well maintained maturity. The number of new patents each year is now approximately equal to the number which are abandoned or expire, so that there are a constant number of about three hundred always in force. There are, of course, a number of applications made during the past two years which have not yet been accepted, so that the curve is here only approximate and subject to correction in later issues.

Figure 2 shows the average life of the patents granted each year, and therefore gives a measure of the value of the inventions. The usual tendency with every industry for the life to fall off to about six years is well shown. The rises in 1897 and 1901 are, however, remarkable. Only a small part of the former is due to the prolongation of Sir O. Lodge's patent No. 11575 of 1897,

Fig. 2.

and the rest is doubtless due to the new fields opened out to the inventor by Mr. Marconi's patents Nos. 12039 of 1896 and 7777 of 1900. A number of the patents taken out since 1900 are still in force, so that the curve here has two values between which limits the average life must lie. These limits get so wide after 1909 that no inferences can be drawn, and the curve is not, therefore, continued beyond this date.

PATENTS APPLICATIONS IN 1913

GREAT BRITAIN.

Number.	Date.	Patentee and Description.
171	Jan 2.	—CROMPTON AND CO., LTD., and HENRY BURGE—Means for maintaining H. F. electrical oscillations in resonant currents. (*Abandoned.*)
633	Jan. 9.	—ARTHUR ROLFE—Wireless transmission of energy.
736.	Jan. 9.	—SIGNAL GESELLSCHAFT M.B.H.—Radiating system for signalling by electric waves from aeroplanes. (*Accepted.*)
802	Jan 10.	—GUGLIELMO MARCONI—Means for generating alternating electric currents. (*Accepted.*)
809	Jan. 10.	—SIDNEY G. BROWN—Wireless Telegraphy and Telephony. (*Abandoned.*)
947	Jan. 13.	—LUCIEN ROUZET—Wireless Telegraph installations for aerial vessels. (*Sealed.*)
1939	Jan. 23.	—HARRY PAGE GEE (for Torikata, Yokoyama and Kitamura)—Oscillation gaps. (*Accepted.*)
1996 1996	Jan. 24.	—SIGNAL GESELLSCHAFT M.B.H.—Receivers for Submarine signalling. (*Patents sealed.*)
1997	Jan. 25.	—WILFRED L. CORRY—Method of transmitting the effect of vibrations by Wireless Telegraphy. (*Abandoned.*)
2184 2185	Jan. 27.	—SIGNAL GESELLSCHAFT M.B.H.—Receivers for submarine signalling. (*Patents Sealed.*)
2917 2918 2919	Feb. 4.	—GUGLIELMO MARCONI—Transmitting apparatus for use in Wireless Telegraphy and Telephony. (*Abandoned*), 2917. (*Accepted*), 2918 and 2919.
2978	Feb. 5.	—WILLIAM H. MALCOLM—Methods of compensation for selenium cells and in the application of selenium cells to Wireless Telegraphy. (*Abandoned.*)
3012	Feb. 5.	—WILLIAM DITCHAM and GRINDELL MATTHEWS' WIRELESS TELEPHONE SYNDICATE, LTD.—Wireless Telephony. (*Abandoned.*)

3103 Feb. 6.—THE RADIO SIGNAL CO. and W. H. SHEPHARD and ALEX. MCKECHNIE—Wireless Telegraph, Telephone or Submarine signalling system.

3246 Feb. 7.—SIGNAL GESELLSCHAFT M.B.H.—Wireless Telegraphy and Telephony. (*Sealed.*)

3771 Feb. 13.—JOSEPH L. FENEMORE, JUNR.—Wireless signalling. (*Abandoned.*)

3829 Feb. 14.—B. BARTON, P. BARTON, BARTON & SON, and R. BLACKWELL & CO., LTD.—Lattice masts, poles, tower columns for Wireless Telegraph stations, transmission lines and the like. (*Accepted.*)

3962 Feb. 15.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and H. DOBELL—Call or alarm apparatus for use in Wireless Telegraphy.

4514 Feb. 21.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and C. S. FRANKLIN—Aerial conductors for use in Wireless Telegraphy. (*Patent Sealed.*)

4777 Feb. 25.—FRED J. CHAMBERS—Apparatus used for
4778 Wireless Telegraphy and the like (4777). Ap-
4779 paratus used for Wireless Telegraphy and the like. (*Abandoned,* 4778.) Receiving apparatus for Wireless Telegraphy (4779).

4901 Feb. 26.—THOMAS E. CLARK—Automatic Wireless train-control apparatus. (*Open to Public Inspection.*)

5040 Feb. 27.—CARL SCHOU—Transmitters for Wireless Telegraphy. (*Patents Sealed.*)

5082 Feb. 28.—EDWARD C. R. MARKS (for Submarine Wireless Co., New York)—Submarine signalling apparatus. (*Patent Sealed.*)

5544 March 5.—EUGEN VICTOR GRATZE—Control or actuation of clocks and other indicating or recording mechanism by Wireless or ether waves.

6192 March 12.—RAYMOND LOUIS ROZE DES ORDONS—Wireless clock-synchronising apparatus. (*Patent Sealed.*)

6479 March 15.—JOHANN SAHULKA—Transmitters for use in Wireless Telegraphy. (*Patent Sealed.*)

6902 March 20.—G. E. HEYL, E. S. SHEPHERD and T. THORNE BAKER—Microphones especially applicable to Wireless Telephony.

7396 March 28.—Graham & Latham, Ltd., and B. F. Sobatka—Self-inductance or tuning coils.

7502 March 29.—Ernest S. Heurtley—Wireless Telegraphy. (*Abandoned.*)

7610 March 31.—Guglielmo Marconi and C. S. Franklin—Transmitting apparatus for use in Wireless Telegraphy and Telephony.

7847 April 3.—Richard Cartwright—Wireless-controlled vessels. (*Abandoned.*)

7977 April 4.—Graham & Latham, Ltd., L. J. Graham, and B. F. Sobatka—Detector for use in Wireless Telegraphy.

8821 April 15.—W. P. Thompson (for Ges. fur Drahtlose Telegraphie, M.B.H.)—Receiving arrangement for use in Wireless Telegraphy and Telephony. (*Patent Sealed.*)

10153 April 30.—Fabio Majorana—Wireless Telephone. (*Sealed.*)

10160 April 30.—Michael Corlon—Caller for Wireless Telegraphy. (*Abandoned.*)

11106 May 10.—Marconi's Wireless Telegraph Co., Ltd., and Cyril P. Ryan—Wireless Telegraphy.

11371 May 15.—Guglielmo Marconi—Wireless Telegraph Transmitters.

11453 May 16.—Marconi's Wireless Telegraph Co., Ltd., and Charles S. Franklin—Means for detecting continuous electrical oscillations.

11833 May 21.—H. L. Short, A. E. Short, and H. O. Short—Wireless Telegraphy. (*Abandoned.*)

11945 May 22.—Laurence B. Turner—Contact make and break device, adapted for use in Wireless Telegraphy and other purposes. (*Abandoned.*)

12074 May 23 and 24.—Wm. Theodore Ditcham and Grin-
12075 dell Matthews' Wireless Telephone Syndi-
12076 cate, Ltd.—Oscillation spark gaps. (*Abandoned,*
12157 12074). Microphones for use in Wireless Telegraphy (12075). Apparatus for use in Wireless Telephony (12076). Switching arrangement for use in Wireless Telegraphy and Telephony (12157).

12942 June 4.—William A. Freeman—Wireless transmitting and recording apparatus. (*Abandoned.*)

13503 June 5.—Thomas Harvey—Apparatus for detecting
13504 and magnifying minute electrical oscillations. (*Abandoned.*) 13503. Receivers for Wireless Telegraphy. (*Abandoned.*) 13504.

13065 June 5.—Wm. T. Ditcham and Grindell Matthews' Wireless Telephone Syndicate—Call or alarm apparatus for use in Wireless signalling.

13310 June 9.—John Hayes Hammond, Junr.—System and apparatus for radio control. (*Open to Public Inspection.*)

13458 June 10.—Robert P. H. Graham—Electrical device for the selective detection of periodic electrical impulses. (*Abandoned.*)

13636 June 12.—Marconi's Wireless Telegraph Co. and
13637 C. S. Franklin—Receivers for use in Wireless Telegraphy and Telephony (13636). Means for increasing the frequency of alternating currents (13637).

13755 June 13.—Wm. Hamilton Wilson—Production of high tension discharges.

13793 June 14.—James A. Gardner and Alex. Ferguson—Apparatus for causing electrical impulses for transmission to a distance. (*Patent Sealed.*)

13945 June 16.—Michel de Lezinier—Rythmatic control-synchronous, differentiated or synthonic by Hertzian waves from a distance and without relays of teledynamic machines and receivers. (*Abandoned.*)

14034 June 17.—Valdemar Poulsen—Apparatus for closing and interrupting electric currents.

14035 June 17.—Emile Girardeau—Supplying radiotelegraphic antennæ. (*Accepted.*)

14927 June 28.—Wm. T. Ditcham and the Grindell Matthews' Wireless Telephone Syndicate—Arrangement for producing electro-magnetic oscillations, particularly for use in radio-telephony. (*Accepted.*)

15097 June 30.—Wm J. Lyons—Electric telegraph receiving apparatus of the selective type. (*Accepted.*)

15283 July 2.—Edward D. Carden—Method of and means for determining the electrical characteristics of high frequency oscillation circuits.

15457 July 4.—T. Thorne Baker and Galletti's Wireless Telegraph and Telephone Co.—Transmission of Wireless signals. (*Abandoned.*)

15566 July 5.—Sterling Telephone and Electrical Co., Ltd., and Wm. Barnes Allcock—Radial selector switches.

15673 July 7.—John G. Balsillie—Wireless Telegraph
15674 transmitter. (*Open to Public Inspection,* 15673).
Wireless Telegraph receivers. (*Accepted,* 15674).

15696 July 8.—Geo. Horatio Jones and Leonard V. Harbor—Method of aerial signalling and intercommunicating with Wireless Telegraphy. (*Abandoned.*)

15869 July 9.—Emile Girardeau—Method of indirect excitation for oscillatory circuits. (*Application void.*)

16917 July 23.—William Dubilier—Method of and means for the production of electric current. (*Patent Sealed.*)

16958 July 24.—Lionel C. Wright—Mica earth arrester for use in Wireless Telegraphy.

16998 July 24.—H. W. Handcock, A. Dykes, and Wm. Duddell — Electrical resonance-operated apparatus.

17164 July 26.—Reozo Wanibuchl—Method of localising the radiant point of electro-magnetic waves and apparatus therefor.

17625 July 31.—William P. Durtnall—Means of generating high and variable frequency current for radiotelegraphy and telephony and analogous applications.

17859 Aug. 5.—Roberto C. Galletti—Wireless signalling.

18024 Aug. 7.—George H. Heyl and T. Thorne Baker—Wireless apparatus.

18326 Aug. 12.—Marconi's Wireless Telegraph Co., Ltd., and H. J. Round—Wireless Telegraph receivers.

18502 Aug. 14.—Guglielmo Marconi and W. S. Entwistle—Transformers for high frequency currents.

18939 Aug. 20.—Ludwig Mach—Apparatus for detecting heat radiations.

18961 Aug. 21.—A. B. WILLIAMS and WM. ALEX. SOLOMON
18962 —Electro-magnetic relays for use in connection with Wireless Telegraph installations and for other purposes (18961). Spark gaps for use in connection with Wireless Telegraph installations (18962).

19855 Sept. 2.—GUILIO C. L. ULIVI—Apparatus for projecting electro-magnetic rays to a distance.

19911 Sept. 3.—PERCY G. WEBB and JOSEPH KAMMER—Apparatus for Wireless Telephony.

19966 Sept. 4.—WM. P. THOMPSON (for Soc. Anon. des Tele-Edouard Belin)—Method of and apparatus for the transmission of messages and designs, such as photographs, cliches, and the like.

20097 Sept. 5.—GUILIO C. L. ULIVI—Apparatus for projecting electro-magnetic rays to a distance.

25021 Sept. 11.—ARTHUR B. WILLIAMS and WM. A. SOLOMON —Rotary interrupters or contact breakers and similar devices in connection with Wireless Telegraphy and like installations for analogous purposes.

20798 Sept. 15.—MARIUS PAUL OTTO—Process and apparatus for establishing synchronisation by means of electric waves.

20806 Sept. 15.—FREDERICK MILLER—Apparatus for the production of and radiation of electrical oscillations.

20937 Sept. 16.—WILLIAM H. WILSON—Production of high-tension discharges.

21212 Sept. 19.—MARIUS PAUL OTTO—Apparatus for manœuvring at a distance marine or aerial torpedoes or other engines.

21672 Sept. 25.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and RICHARD N. VYVYAN—Improvements in the connections of electrical condensers.

21732 Sept. 26.—JOHN K. PICKFORD—Microphones, transmitters, detectors and the like.

22220 Oct. 2.—ARTHUR B. WILLIAMS and WM. ALEX. SOLOMON—Electro-magnetic relay for use in connection with Wireless Telegraphic installations and for other purposes.

22437 Oct. 6.—FRED. J. CHAMBERS—Radiotelephony.

22537 Oct. 6.—John G. Balsillie—Wireless Telegraph transmitters.

23113 Oct. 13.—Henri Abraham—Receivers adapted for Wireless Telegraphy. (*Open to Public Inspection.*)

23340 Oct. 15.—Marconi's Wireless Telegraph Co., Ltd., and Cyril P. Ryan, R.N.—Means for operating gas valves from a distance.

23557 Oct. 17.—Marconi's Wireless Telegraph Co., Ltd., and Chas. S. Franklin—High frequency alternators.

23728 Oct. 20.—Signal Gesellschaft M.B.H.—Radiating system for signalling by electric waves from aeroplanes. (*Accepted.*)

24148 Oct. 24.—Marconi's Wireless Telegraph Co., Ltd., and A. Gray—Masts. (*Accepted.*)

25085 Nov. 3.—Thomas D. Smith—Telescopic radiotelegraphic masts.

25434 Nov. 7.—Frank P. W. Allen—Wave detector for Wireless Telegraphy and Telephony.

25612 Nov. 8.—Ivor Scott Winby and Reginald Garrett—Wireless Telegraphy.

26402 Nov. 18.—William T. Ditcham—Radiotelephony.

26833 Nov. 21.—Peder Olaf Pederson and Valdemar Poulsen—Multiple arrangement of high frequency electric current generators.

26934 Nov. 22.—Soc. Marius Latour et Cie—Transformation of the frequency of high-frequency alternating currents for Wireless Telegraphy and Telephony.

27175 Nov. 25.—Wm. J. Mellersh Jackson (Signal Ges. M.B.H.)—Radiotelegraph station.

27183 Nov. 25.—B.T.-H. Co., Ltd. (Allgemaine Elt. Ges., Germany)—Methods of tuning alternating currents and circuits.

27329 Nov. 27.—R. C. Galletti—Production of electric impulsive discharges.

27480 Nov. 28.—Marconi's Wireless Telegraph Co., Ltd., and H. J. Round—Receivers for Wireless Telegraphy.

28183 Dec. 6.—ANDRE BLONDEL—Method of determining the location of radiotelegraphic lighthouses or the like. (*Open to Public Inspection.*)

28277 Dec. 8.—WM. H. SHEPHARD and A. E. MCKECHNIE—
28278 Line or Wireless Telegraph systems.

28409 Dec. 9.—FRED. G. SARGENT—Wireless Telegraphy.

28413 Dec. 9.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and H. J. ROUND—Receivers for use in Wireless Telegraphy.

28602 Dec. 11.—EGMONT C. HOEGERSTAEDT and HAROLD S. WESTCOTT—Wireless Telegraphy.

28829 Dec. 13.—WM. H. SHEPHARD and A. E. MCKECHNIE—Transmitting apparatus for use with Wireless Telegraphic or Submarine sound signalling systems.

28839 Dec. 13.—OLAF PEDERSEN—High frequency electric current generators. (*Open to Public Inspection.*)

29447 Dec. 20.—JOSEF SCHIESSLER—Apparatus suitable for use in Wireless Telegraphy or Telephony.

29711 Dec. 24.—JOHN D. L. BRADWELL and GEORGE BRADWELL — Radiotelegraphic or like receiving apparatus.

29712 Dec. 24.—ROBERTO C. GALLETTI—Transmission of Wireless signals.

29902 Dec. 29.—ADRIAN F. SYKES—Generator of electrical oscillations.

29946 Dec. 30.—GRAF GEORG VON ARCO and ALEXANDER MEISSNER—Transmitting arrangement for Wireless Telegraphy and Telephony.

FRANCE.

453085 Jan. 13.—SOCIETE SIGNAL G.m.b.H.—Aeroplane with radiotelegraphic equipment.

453433 Jan. 14.—JEGOU—Electrolytic Detector.

453900 Feb. 12.—ROUCHE—Crystal Detector.

455805 March 22.—PERICAUD—Crystal Detector.

455800 March 22.—SOUDART—Arrangement for the reception of audible signals.

456069 March 27.—MAES—Portable Wireless Telegraph set for pocket use.

455018 May 9.—EDOUARD BELIN—Improved means for the transmission of electric signals.

457902 May 14.—BOULAGE—System of relays applicable to bells for indicating waves used in Wireless Telegraphy.

458019 May 19.—GIRARDEAU—Method for determining the position of ships by means of Wireless Telegraphy.

458067 May 20.—ROUZET—Regulation of induction coils or Tesla transformer windings employed in Wireless Telegraphy and other applications of high-frequency currents.

455479 May 25.—ROUZET—Installation of Wireless Telegraphy on aeroplanes.

458901 June 6.—DUBILIER—Method for the production of electric currents for Wireless Telegraphy and other applications.

458908 June 6.—MICHEL ET JEANNO—Alarm signal operated by Wireless Telegraphy.

458952 June 7.—HAMMOND—Improved method of control by electro-magnetic waves.

GERMANY.

Z.7688/21a. DR. LUDWIG ZEHNDER, Berlin—Earth condenser for Wireless Telegraphy.

G.37537/21a. DR. BRUNO GLATZEL, Berlin—Method and arrangement for measuring the damping of electric oscillatory circuits.

B.67693/21a. HANS BOAS, Berlin—Spark gap for the production of highly damped oscillations. Supplement to Patent No. 254175.

F.33728/21a. W. FISCHER-BRILL, Berlin—Phonetic relay.

P.28663/21a. GREENLEAF WHITTIER PICKARD, Amesbury, Mass., U.S.A.—Rectifying detector for Wireless Telegraphy with silicium as rectifying electrode.

L.34021/21a. C. LORENZ, A.g., Berlin—Method of connections for Wireless Telegraphy.

L.35532/21a. C. LORENZ, A.g.—Indicator of electric waves.

L.34934/21a. C. LORENZ, A.g.—Method and arrangement for the receiving in the wireless transmission of messages.

P.28294/21a.	DR. ING. W. PETERSEN—Self-exciting electrostatic asynchronous machine as receiver. Supplement to Application P.29419.
A.22525/21a.	ALLGEMEINE ELEKTRIZITÄTS - GESELLSCHAFT — Method for the tuning of high-frequency currents.
L.35341/21a.	C. LORENZ, A.g.—Method and arrangement of connections for the working of series spark gaps.
B.70137/21a.	HANS BOAS, Berlin—Spark gap for the production of highly damped oscillations. Supplement to Patent No. 254175.
A.21999/21d.	ALLGEMEINE ELEKTRIZITÄTS - GESELLSCHAFT — Synchronous machine.
R.35767/21a.	J. H. REINECKE, Bochum—Arrangement of relays which are actuated only by a regulated succession of calling impulses.
A.22988/21a.	ALLGEMEINE ELEKTRIZITÄTS - GESELLSCHAFT — Production of high-frequency currents.
B.69219/21a.	HANS BOAS, Berlin—Arrangement of connections for the production of oscillations by means of the quenched spark gap.
G.36547/21a.	GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Transmitter for Wireless Telegraphy.
C.21678/21a.	DR. WALTER BURSTYN, Berlin—Method of connections for the working of a mercury vapour lamp acting as producer of oscillations.
A.23517/21a.	ALLEGEMEINE ELEKTRIZITÄTS - GESELLSCHAFT — Telegraphy with high-frequency currents
G.37237/21a.	GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE, m.b.H.—Method and arrangement for the production of electric oscillations for Wireless Telegraphy.
G.37622/21c.	GESELLSCHAFT FUR DRAHTLOSE TELEGRAPHIE — Connection of insulators, especially for Wireless Telegraphy.
S.37368/21e.	SIEMENS AND HALSKE, Berlin—Ammeter for high-frequency currents, based upon the principle of induction.
G.37718/21a.	GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Method of producing oscillations with displaced phases in several oscillatory circuits independent from each other.
G.37752/21a.	GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Connection of the detector or tikker.

G.37850/21a. Gesellschaft für Drahtlose Telegraphie—Wireless apparatus for airships.

L.35243/21a. C. Lorenz, A.g.—Key-relay.

B.68436/21a. Hans Boas—Method of transforming the frequency of alternating currents.

L.35762/21a. C. Lorenz, A.g.—Method of avoiding disturbances in wireless transmission.

M.47796/21a. Marconi's Wireless Telegraph Co., Ltd., London—Improvements in installations for Wireless Telegraphy.

C.21403/21a. Compagnie Générale Radiotélégraphique, Paris—Arrangement for the charging in parallel and discharging in series of two condensers of practically the same capacity.

L.33648/21a. C. Lorenz, A.g.—Multiple loop antenna for the purposes of the wireless transmission of messages.

G.37905/21a. Gfsellschaft für Drahtlose Telegraphie—Antenna for aircraft.

P.26753/21a. Polyphos Elektrizitäts-Gesellschaft m.b.H., Munich—Method for the production of non-damped electric oscillations by means of incandescent light discharges.

G.37982/21a. Gesellschaft für Drahtlose Telegraphie—Arrangement for the increase of the variations of the currents of a low amplitude.

Sch.42558/21a. Carl Schou, Sölleröd, Denmark—Method for the emission of radio-telegraphic signals.

G.37353/21a. Leonid Gabrilovitsch, St. Petersburg—Arrangement for Wireless Telephony with damped oscillations.

P.28558/21a. Polyphos Elektrizitäts-Gesellschaft m.b.H.—Method for the production of non-damped electric oscillations by means of incandescent light discharges.

A.23433/21a. Allgemeine Elektrizitäts - Gesellschaft—High-frequency machine for Wireless Telegraphy and Telephony.

A.23220/21a. Allgemeine Elektrizitäts - Gesellschaft—Method and connections for the maintenance of the number of revolutions of high-frequency machines.

V.11541/21a. Guiseppe Vanni, Rome—Liquid-microphone.

G.38216/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Receiving arrangement for musical signals.

G.38254/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Method for receiving non-damped electric oscillations.

G.38271/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Arrangement for recording musical signals.

G.38396/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Receiving non-damped electric oscillations.

L.35955/21a. C. LORENZ, A.g.—Earth-antenna.

L.36265/21a. C. LORENZ, A.g.—The production of high-frequency alternating currents.

L.36571/21a. C. LORENZ, A.g.—Contact detector for electric oscillations.

L.34591/21a. C. LORENZ, A.g.—Wireless transmitter.

G.37241/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Call signal apparatus.

G.36241/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Call apparatus for the wireless transmission of messages.

K.54425/21a. KEMP AND LAURITZEN, Copenhagen—Arrangement for the conversion of electric alternating currents into acoustic vibrations by using resonators tuned to various frequencies.

G.38458/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Receiving arrangement for Wireless Telegraphy on air-craft.

R.38131/21a. RAPHAEL ROBLIN, Hardricourt, Seine et Oise, France—Relay for Wireless Telegraphy.

G.37208/21a. LEONID GABRILOVITCH, St. Petersburg—Method and arrangement for the simultaneous sending and receiving of wireless telegrams by means of the same antenna.

B.67848/21a. JOSEPH FRIEDRICH BAUMANN, Munich—Arrangement for the increase of the effects, at a receiving apparatus, of the arriving electric signals.

G.37186/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Method of connections for musical transmitters for impulsive excitation.

U.5061/21a. UNIVERSAL CHEAP CABLES, LTD., London—Electric printing telegraph system.

C.22412/21a. EDWARD RUSSELL CLARKE, London—Method for

the maintenance of electric oscillations in an oscillatory circuit.

G.36944/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Method of tuning, operating, and producing tone-frequencies at the production of high-frequencies in static transformers with auxiliary magnetisation.

S.38552/21a. DR. JOHANN SAHULKA, Vienna—Transmitter for Wireless Telegraphy.

L.36175/21a. DR. GOTTHELF LEIMBACH, Göttingen—Method of wireless communication into the interior of the earth.

S.38348/21a. DR. JOHANN SAHULKA—Transmitter for electric waves.

G.38215/21a. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE—Arrangement for the reproduction of wireless telegraph signals, which have been taken by a phonograph in the form of audible tones.

M.48137/21a. DR. GUIDO MOELLER, Berlin—Strong current microphone for telephony with and without wire.

B.73402/21a. HANS BOAS—Method of manufacturing flat coils of a band-shaped conductor for the purposes of the production of quick oscillations, but especially in Wireless Telegraphy.

A.23265/21c. ALLGEMEINE ELEKTRIZITÄTS - GESELLSCHAFT—Multiple spark gap with a series resistance.

D.26828/21a. W. DUBILIER, New York—Arrangement of electrodes for the production of electric high-frequency oscillations.

M.48252/21a. DR. RICCARDO MORETTI, Rome—Method for the production of current impulses in the same direction in one or more oscillatory circuits by means of a discharger cooled by water or another liquid.

UNITED STATES OF AMERICA.

793278 Oct. 4.—H. SHOEMAKER—Method of and apparatus for Radio Signalling.

803101 Nov. 26.—G. MARCONI—Wireless Telegraphy.

809711 Dec. 31.—G. MARCONI—Transmitting Apparatus for use in Wireless Telegraphy and Telephony.

809712 Dec. 31.—G. MARCONI—Transmitting Apparatus for use in Wireless Telegraphy and Telephony.

809607 Dec. 31.—C. S. FRANKLIN—Aerial Conductors.

PARTICULARS OF THE LEADING COMPANIES ENGAGED IN THE COMMERCIAL DEVELOPMENT OF WIRELESS TELEGRAPHY

Amalgamated Wireless (Australasia) Limited

Incorporated.—July 11th, 1913, in State of New South Wales.

Head Office.—Culwulla Chambers, Castlereagh Street, Sydney.

New Zealand Office.—Australasia Chambers, Wellington.

Directors.—Hugh Robert Denison (Chairman and Managing Director), John Macallum Jolly, Charles P. Bartholomew, Ernest T. Fisk (Technical Manager), John H. Forrest.

Secretary.—John H. Forrest.

Capital.—£140,000 in 140,000 shares of £1 each. Issued 140,000 shares of £1 each, all fully paid up. The financial year of the Company ends at November 30th.

The Company owns a perpetual license to use and exploit the Marconi and Telefunken patents in the Commonwealth of Australia and Dominion of New Zealand and in that part of the Pacific and Indian Oceans bounded by the 20 deg. north and 60 deg. south latitude and the 110 deg. west and 110 deg. east longitude.

Compagnie Française Maritime et Coloniale de Télégraphie Sans Fil

Incorporated.—24th April, 1903.

Head Office.—35, Boulevard des Capucines, Paris, France.

Directors.—Baron de la Chevreliere, Commendatore G. Marconi, Alfred Musnier, John Dal Piaz, Charles Roux.

Secretary.—Monsieur F. Gondry.

Engineer.—A. Vivien.

Capital.—Authorised, 500,000 francs in 5,000 shares of 100 francs each. Issued, 100,000 francs in 1,000 shares of 100 francs,

each fully paid, and 200 Profit shares having no capital denomination. The financial year of the Company ends at December 31st in each year. Dividends at the rate of 5 per cent. per annum have been paid on the capital shares of the Company in respect of each of the years 1906, 1907, 1908, 1909, 1910, and 1911, and 10 per cent. for the year 1912. The Company owns and operates the wireless telegraph apparatus on nearly 100 vessels.

The Company holds the exclusive license of Marconi's Wireless Telegraph Company, Limited, and the Marconi International Marine Communication Company, Limited, for France, its colonies and dependencies, and vessels flying the French flag.

Compagnie Générale de Radiotelegraphie, Société Anonyme.

Incorporated.—January 15th, 1914.

Head Office.—63, Boulevard Haussmann, Paris.

Directors.—Monsieur d'Arsonval (President), MM. Gabion and Bitterli.

Manager.—Monsieur Tronchon.

Capital.—1,500,000 francs, divided into 3,000 shares of 500 francs each, all issued and paid up.

This Company purchased the assets of the Cie Générale Radiotélégraphique in liquidation. The Company owns and operates the patents of Lepel and Joly.

Compagnie Universelle de Télégraphie et de Téléphonie Sans Fil.

Incorporated.—September 25th, 1912.

Head Office.—20 bis, Rue la Boëtie, Paris.

Directors.—Lazare Weiller (President), Marcel Bloch, Emile Chalancon, Baron de la Chevreliere, Alexandre Imbert, Godfrey C. Isaacs, Rene Robard, Ernest Georges Sins.

Secretary.—Georges Tharel.

Capital.—10,000,000 francs divided into 100,000 shares of 100 francs each, all subscribed and paid for in cash. 100,000 Parts Beneficiaires have also been issued.

The financial year ends at March 31st.

The Company has acquired the whole of the patents in respect of wireless telegraphy or telephony which have been taken out in the name of Professor Rudolph Goldschmidt, and a right

Lightship "Alarm" in position at the Mersey Bar Station, fitted with a Wireless Installation and Submarine Signal Bell.

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to any further inventions made by him in respect of wireless telegraphy or telephony, and any patents for which he may apply in connection with such inventions for all countries except Germany, its colonies and dependencies.

In 1913 Marconi's Wireless Telegraph Company, Limited, acquired an interest in the above Company.

Compañia Marconi de Telegrafia Sin Hilos Del Rio de La Plata.

Incorporated.—August 4th, 1906.

Head Office.—Tornquist Building, 132, San Martin, Buenos Aires, Argentine.

Directors.—Senor Don Florence O'Driscoll (Managing Director), Colonel Sir Thomas Holdich, K.C.M.G., K.C.I.E., C.B., Godfrey C. Isaacs, Commendatore G. Marconi, Captain Guillermo Jose Nunes (President), Senor J. A. Pilling, Senor Carlos Pereira Pinto, Dr. Julio Pueyrredon, Enrique Schlieper, Sydney St. J. Steadman, Antonio Terrarosa.

Secretary.—Enrique Schlieper.

Chief Engineer.—E. Berry.

Capital.—$2,000,000 gold, represented by 250,000 shares of $5 gold each, series "AA," fully paid, and 150,000 Preference shares of 5 per cent. non-cumulative of $5 gold each, series "BB," 35 per cent. has been called up on the "BB" shares. The balance is payable in instalments of 10 per cent. with not less than thirty days' notice. The financial year of the Company ends at May 31st.

The Company owns the Marconi patents and patent rights for the Argentine Republic, and has licenses from Marconi's Wireless Telegraph Company, Limited, and the Marconi International Marine Communication Company, Limited, to work the Marconi system in the Republics of Argentine, Uruguay, and Paraguay. The Company has the permission of the Government to erect wireless telegraph stations within the territorial limits of the Argentine Republic and on vessels flying the Argentine flag. The Company is constructing a high-power wireless station in the Argentine Republic to communicate direct with a similar station in Europe, and the Argentine Government approved this project on August 10th, 1912.

Compañia Nacional de Telegrafia Sin Hilos.

Incorporated.—December 24th, 1910.

Head Office.—Calle de Alcala 43, Madrid.

Directors.—Exco. Sr. General Don Jose de Bascaran, Excmo. Sr. Conde de Albiz Don Antonio Comyn, Sr. Eduardo Estelat, Godfrey C. Isaacs, Sr. Don Jaime Macnaughton, Commendatore G. Marconi, Sr. Francisco Setuain.

Secretary.—Don Pablo Figuerola Ferretti.

Capital.—6,500,000 pesetas divided into 8,000 6 per cent. Participating Preference shares of 500 pesetas each, and 5,000 Ordinary shares of 500 pesetas each.

The financial year ends on December 31st.

This Company was formed to take over from La Compania Concesionairia de Servicio Publico Espanol de Telegrafia sin Hilos, who were unable to carry out their obligations, the concession from the Spanish Government for the construction and exploitation of a public wireless telegraph service in Spain and its colonies. The Company has ten wireless telegraph land stations erected and working at Aranjuez, near Madrid, Cadiz, Barcelona, Teneriffe, Las Palmas, Vigo, Soller, Finisterre, Santander, and Cape Palos, and has further stations in course of construction. The Company holds an exclusive license from Marconi's Wireless Telegraph Company, Limited, to use and exploit its patents in Spain and her colonies, except on vessels of the mercantile marine.

The Company proposes to establish a direct wireless telegraph service between Spain and England by means of the Marconi Company's station at Poldhu, Cornwall.

Deutsche Betriebs Gesellschaft Für Drahtlose Telegraphie m.b.H.

Incorporated.—January 14th, 1911.

Head Office.—Tempelhofer Ufer 9, Berlin, S.W. 61.

Directors.—Dr. Franke, Commerzienrat Mamroth, Commendatore G. Marconi, General A. Thys, M. Travailleur, Georg Count von Arco, Geheimer Legationsrat Fritz Rose.

Manager.—Hans Bredow.

Capital.—1,500,000 marks.

The Company exploits wireless telegraphy on vessels of the mercantile marine of Germany and Austria-Hungary. The system of wireless telegraphy installed by them is known as the "Debeg." At December 31st, 1913, the "Debeg" owned and operated the wireless telegraphic apparatus on 295 vessels. The financial year of the Company ends at September 30th in each year.

Gesellschaft für Drahtlose Telegraphie m.b.H. (Telefunken).

Incorporated.—June 15th, 1903.

Head Office.—Tempelhofer Ufer 9, Berlin.

Directors.—Count von Arco, Hans Bredow, Karl Solff (Vice-Director).

Founded by the Allgemeine Elektrizitäts-Gesellschaft, Berlin, and Siemens and Halske A.G., Berlin, for the exploitation of the patents of Professor Slaby, Professor Braun, and Count von Arco all over the world.

The Company, whose shares are in the sole possession of the Allgemeine Elektrizitäts-Gesellschaft and Siemens and Halske, Berlin, is interested in the following Companies :—

- Deutsche Betriebsgesellschaft für drahtlose Telegraphie m.b.H., Berlin, S.W.
- Deutsche Südseegesellschaft für drahtlose Telegraphie A.G., Berlin.
- Société Anonyme Internationale de Télégraphie sans Fil, Brussels.
- Atlantic Communication Company, New York.
- Telefunken East Asiatic Wireless Telegraph Co., Shanghai.
- Amalgamated Wireless (Australasia), Ltd., Sydney.

Marconi International Marine Communication Company, Limited

Incorporated.—April 25th, 1900.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Commendatore G. Marconi, G. C. Isaacs (Managing Director), Major S. Flood-Page, Alfonso Marconi, H. S. Saunders, M. Travailleur, Captain H. R. Sankey, R.E. (retired), General A. Thys.

Manager.—W. W. Bradfield.

Secretary and Deputy Manager.—H. W. Allen, F.C.I.S.

Marine Superintendent.—Captain C. V. Daly.

Traffic Manager.—W. R. Cross.

Capital.—Authorised, £350,000 in £1 shares. Issued, £306,084 in 306,084 shares, fully paid. 5½ per cent. First Mortgage Debentures (Bearer). Authorised, £250,000. Issued and outstanding, £125,000 in £20 bonds. Secured (without trust deed) as a floating charge on the undertaking and all the property. Redeemable at par July 1st, 1941. Interest payable January 1st and July 1st.

Dividends.—Paid 5 per cent. for 1910, 7 per cent. for 1911, and 10 per cent. for 1912, and an interim dividend of 5 per cent. in respect of 1913.

The accounts are made up to December 31st in each year.

This Company was formed for the purpose of working throughout the world, except in the United States of America, Hawaii, Chili, and colonies or dependencies of those States, an exclusive license for all maritime (being mercantile or yachting) purposes granted by Marconi's Wireless Telegraph Company, Limited. The Company has transferred to Associated Companies its rights in Canada, Argentina, Uruguay, Australasia, and all European countries and their dependencies except Great Britain and Ireland and Italy. In 1909 the Company and Marconi's Wireless Telegraph Company, Limited, entered into an agreement with the Post Office, which provides, in consideration of the payment of £15,000, for the transfer to the Post Office of the coast stations in the United Kingdom. This Company owns and operates the wireless telegraph apparatus on about 800 vessels of the mercantile marine.

Marconi Press Agency, Limited (Private Company)

Incorporated.—October 7th, 1910.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Godfrey C. Isaacs, Major S. Flood-Page, Alfonso Marconi, Captain H. Riall Sankey, Henry S. Saunders.

Secretary.—Henry W. Allen, F.C.I.S.

Capital.—£1,000 in 1,000 shares of £1 each.

The Company is the publisher of "The Wireless World"

(monthly), "The Year Book of Wireless Telegraphy and Telephony," "Handbook of Technical Instruction for Wireless Telegraphists" (Hawkhead), "The Elementary Principles of Wireless Telegraphy," etc.

Marconi Wireless Telegraph Company of America

Incorporated.—November 8th, 1899, under the laws of New Jersey.

New York Office.—Woolworth Building, 233, Broadway, New York, U.S.A.

Directors.—John Bottomley (Vice-President), Major S. Flood-Page, Marcus Goodbody, Harry E. Griggs, John L. Griggs (temporary), Hon. J. W. Griggs (President), Godfrey C. Isaacs, Commendatore G. Marconi (Vice-President), Edward J. Nally, James W. Pyke, James R. Sheffield, George S. de Sousa, Edward L. Young.

Vice-President and General Manager.—Edward J. Nally.

Secretary and Treasurer.—John Bottomley.

Chief Engineer.—F. M. Sammis.

Traffic Manager.—G. S. de Sousa.

Capital.—$10,000,000, divided into 2,000,000 shares of $5 each, April 18th, 1912. Special settling day on the London Stock Exchange, June 19th, 1912, in 2,000,000 shares. The financial year ends December 31st.

The Company has the sole right to use and exploit the Marconi patents in the United States of America, the Hawaiian Islands, Philippine Islands, Cuba, Porto Rico, Alaska, and the Aleutian Islands. The Company owns 60 land stations, including a high-power station at Cape Cod, and at December 31st, 1913, owned and operated the wireless apparatus on over 450 ships of the Mercantile Marine. The whole of the physical assets of the United Wireless Telegraph Company in the United States were acquired by the American Marconi Company in April, 1912. The Marconi Wireless Telegraph Company of America is now erecting high-power Wireless Telegraph stations for communication between New York and Great Britain and Norway, and also to communicate from New York to San Francisco and the Sandwich Islands, and proposes to extend later to the Philippines, China and Japan, and from New York to Cuba, Panama, and subsequently with each of the South American States. The Company has executed several large

orders for the United States Government. The American Marconi Company is party to an agreement with the Western Union Telegraph Company of the United States and the Great North-Western Company of Canada, under which it has the use of the 25,000 telegraph offices of these two cable companies in the United States and Canada for the collection and delivery of Marconigrams.

At 31st January, 1913, there was a balance to the credit of the Company's profit and loss account of $224,483.65 and on the 1st August, 1913, the Company paid a dividend of 2 per cent. in respect of the year ended 31st January, 1913.

Marconi Wireless Telegraph Company of Canada, Limited

Incorporated.—By special Act of the Dominion of Canada on August 13th, 1903.

Head Office.—Shaughnessy Building, 137, McGill Street, Montreal.

Directors.—Commendatore G. Marconi, Andrew A. Allan, Robert Bickerdike, M.P., G. M. Bosworth, J. N. Greenshields, Godfrey C. Isaacs, W. D. Birchall, J. H. Lauer (General Manager), E. J. Nally.

Secretary and Treasurer.—A. E. Reoch.

Capital.—Authorised and issued capital, $5,000,000 in 1,000,000 shares of $5 each, fully paid. Special settling day on the London Stock Exchange, March 22nd, 1912, in 1,000,000 shares. The financial year of the Company ends at January 31st.

The Company owns the sole right to use and exploit the Marconi patents in the Dominion of Canada and the Colony of Newfoundland.

The Company concluded an agreement on April 5th, 1911, with the Canadian Government, which provided that the Company should operate and maintain on behalf of the Canadian Government the Wireless Telegraph stations on the eastern coasts of Canada, twenty in all, for a period of twenty years. On September 17th, 1912, a further agreement was entered into with the Canadian Government providing that the Marconi Company should operate and maintain, on behalf of the Canadian Government, nine Wireless Telegraph stations on the Great Lakes. This agreement to run concurrently with the one concluded on April 5th, 1911.

An agreement between the Newfoundland Government and

the Company came into force on April 20th, 1912, under which the Canadian Marconi Company has an exclusive license to work Wireless Telegraph stations in the Colony of Newfoundland. The agreement also provides for the Company to operate eight Wireless Telegraph land stations on behalf of the Government, and to erect and operate four further such stations.

The Company receives under the above two agreements subsidies amounting to approximately $100,000 per annum.

Under the agreements with the Newfoundland and Canadian Governments the following stations are operated:—

Ten stations for the Newfoundland Government, the controlling station of which, at Fogo, is the property of the Company.

Twenty-two stations in Eastern Canada and Newfoundland for the Canadian Government, four of which are the property of the Company.

Five stations in the Great Lakes on behalf of the Canadian Government.

The Marconi Wireless Telegraph Company of Canada, Limited, owns the high-power Wireless Telegraph station at Glace Bay, by which, in conjunction with the station at Clifden, Ireland, a public Wireless Telegraph Service is conducted with Great Britain and the Continent of Europe. The Company owns and operates the Wireless Telegraph apparatus on nearly 100 vessels.

The Canadian Government granted a subsidy of $80,000 towards the cost of erecting the Glace Bay station.

An important factor in the new business anticipated by this Company during the coming year is the construction of two high-power stations at Hudson Bay and Le Pas, Manitoba, for inter-communication. This important contract was awarded to this Company by the Department of Railways in connection with the construction of the new Hudson Bay Railroad by the Government, and marks an important factor in Wireless Telegraphy in the utilisation of the Marconi system for covering wide distances over land. It is probable that further developments may ensue in this direction in the near future.

Marconi's Wireless Telegraph Company, Limited

Incorporated.—July 20th, 1897, as Wireless Telegraph and Signal Co., Ltd.; name changed as above in March, 1900.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Commendatore G. Marconi, LL.D., D.Sc. (Chair-

man), Godfrey C. Isaacs (Managing Director), Major S. Flood-Page, Captain H. Riall Sankey, R.E. (ret.), H. S. Saunders, Samuel Geoghegan, M.I.M.E., M.I.C.E.I., Alfonso Marconi, General Albert Thys, Mons. M. Travailleur.

Manager.—W. W. Bradfield.

Secretary and Deputy Manager.—Henry W. Allen, F.C.I.S.

Chief Engineer—Andrew Gray.

Traffic Manager.—Otto Rochs.

This Company was formed to acquire Mr. Guglielmo Marconi's patents for Wireless Telegraphy in all countries except Italy, its colonies and dependencies. The Company holds, *inter alia*, 186,290 fully-paid £1 shares in the Marconi International Marine Communication Company, Limited; 157,740 fully-paid $5 shares, series "AA," and 78,250 $5 shares (35 per cent. paid), series "BB," in the Cia. Marconi Telegrafia sin Hilos del Rio de la Plata; 566,826 fully-paid $5 shares in the Marconi Wireless Telegraph Company of America; and 414,855 fully-paid $5 shares in the Marconi Wireless Telegraph Company of Canada, Limited. In October, 1911, the Company took over the patents of the Lodge-Muirhead Syndicate, Limited. The Company has in hand important contracts for the erection of Wireless Telegraph stations in nearly every part of the world. The Company owns the high-power Wireless Telegraph stations at Clifden, Ireland, and Poldhu, Cornwall, and is erecting other high-power Wireless Telegraph stations for account of its subsidiary companies in Wales, New York, San Francisco, Honolulu, Buenos Aires, etc. In 1912 the Company erected new and extensive works at Chelmsford to enable it to cope with its rapidly increasing business.

Accounts and Dividends.—Accounts are made up at December 31st and usually submitted in June following. In respect of each of the years 1911 and 1912 the Company paid dividends of 17 per cent. on the Preference shares and 20 per cent. on the Ordinary shares. Interim dividends in respect of the year 1913 have been paid as follows:—7 per cent. on the Preference shares on October 1st, 1913, and 10 per cent. on the Ordinary shares on January 31st, 1914.

Capital.—Authorised, £1,500,000 in 1,250,000 Ordinary shares of £1 each, and 250,000 Cumulative Participating Preference shares of £1 each. The Preference shares are entitled to a cumulative dividend of 7 per cent., and, after the Ordinary shares have received a 10 per cent. non-cumulative dividend, to share *pari*

passu with the latter shares in surplus profits remaining. Issued, 250,000 Preference shares and 1,222,688 Ordinary shares.

In October, 1913, the Company created 500,000 new Ordinary shares of £1 each, such shares to rank for dividends declared in respect of the period commencing 1st day of January, 1914, and in all other respects to rank *pari passu* with the existing Ordinary shares of £1 each. Of these shares 250,000 were offered to the shareholders of the Company at the price of £3 5s. per share and have all been issued, and 222,688 shares have been issued in connection with the arrangements made to acquire shares of the Compagnie Universelle de Telegraphie et Telephonie sans fil.

On July 30th, 1913, the Company entered into a contract with the British Postmaster-General for the erection of long-distance Wireless Telegraph stations in (1) England, (2) Egypt, (3) East Africa, (4) South Africa, (5) India, (6) Singapore or the Malay Peninsula, and under this contract the Company is entitled, in addition to the contract price for the supply of the stations, to a percentage of the gross receipts of each station during such period not exceeding 28 years (subject to the provision for determination by the Postmaster-General at the expiration of 18 years), as any apparatus covered by any patent owned by the Company shall be used.

Russian Company of Wireless Telegraphs and Telephones

Incorporated.—October 8th, 1908.

Head Office.—14, Lopuchinskaia, St. Petersburg, Russia.

Directors.—Commendatore G. Marconi, G. C. Isaacs, S. M. Eisenstein, Pierre de Balinski, M. Salberg, Adrian Simpson (Managing Director), Admiral I. F. Bostrem, I.R.N. (retired).

Secretary.—Leon Eisenstein.

Capital.—Originally 1,200,000 roubles in 12,000 shares of 100 roubles each. This capital was increased to 1,800,000 roubles in November, 1911, in order to enable the Company to acquire a license from Marconi's Wireless Telegraph Company, Limited. The financial year ends December 31st (Russian date). The capital was further increased in 1913 to 2,400,000 roubles in 24,000 shares of 100 roubles each.

The Company owns the Russian patents taken out in the name of S. M. Eisenstein, and also holds an exclusive license to use and exploit the Marconi Company's patents in Russia (exclud-

ing stations for international communication or on vessels of Russian Mercantile Marine).

The Company has supplied the Russian Government with a large number of Wireless Telegraph stations, and has now a very large amount of work in hand for that Government.

In May, 1913, the Company declared a dividend of 6 per cent. in respect of the year 1912, which was paid on October 1st, 1913.

Société Anonyme Internationale de Télégraphie Sans Fil

Incorporated.—March 31st, 1913.

Head Office.—13, Rue Brederode, Brussels.

Directors.—General A. Thys (Chairman), M. Travailleur (Managing Director), Major S. Flood-Page, Godfrey C. Isaacs, Commendatore G. Marconi, Captain H. Riall Sankey, Count Georg von Arco, Hans Bredow, Dr. Adolf Franke, Paul Mamroth, F. Cattier, G. Perier.

Capital.—2,250,000 francs, divided into 4,500 shares of 500 francs each, all issued and fully paid.

The financial year ends at December 31st.

The Company exploits Wireless Telegraphy on vessels of the mercantile marine of all European countries excepting the United Kingdom of Great Britain and Ireland, Germany, Austria-Hungary, Italy and France, and at the present time owns and operates Wireless Telegraph apparatus on about 165 vessels.

Société Francaise Radio-Electrique, Société Anonyme.

Incorporated.—April 4th, 1910.

Head Office.—10, Rue Auber, Paris.

Directors.—Monsieur le Comte de Beaumont (President), MM. Fondere, Girardeau, Desachy, de Rivaud, Desclaux, Vinet, de la Taille, Dumont, Wormser, and Bassee.

Managers.—MM. Girardeau and Desachy.

Capital.—1,500,000 francs, divided into 15,000 shares of for the year 1912 a dividend of 10 per cent.

The Company owns and operates the patents of Bethenod and Girardeau.

Spanish and General Wireless Trust, Limited

Incorporated.—February 16th, 1912.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Godfrey C. Isaacs (Managing Director), Alfonso Marconi, Major S. Flood-Page, Captain H. Riall Sankey, Henry S. Saunders.

Secretary.—Henry W. Allen, F.C.I.S.

Capital.—Authorised, £350,000 in 350,000 shares of £1 each. Issued, 249,007 shares of £1 each. The object of the Company is to hold shares in the subsidiary Marconi Companies, in particular those of the Compania Nacioñal de Telegrafia sin Hilos, the denomination of whose shares renders them difficult to negotiate on the London Stock Exchange. The Company holds at present 12,350 Bearer shares of 500 pesetas each in La Compania Nacioñal de Telegrafia sin Hilos.

At the 30th June, 1913, the profit and loss account showed a credit balance of £4,654 4s. 7d.

Trans-Oceanic Wireless Telegraph Company, Limited (Private Company)

Incorporated.—December 17th, 1913.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Commendatore G. Marconi, LL.D., D.Sc. (Chairman), Godfrey C. Isaacs, Captain H. Riall Sankey, Maurice Alfred Braunstein.

Secretary.—Henry W. Allen, F.C.I.S.

The Company was formed to acquire from Marconi's Wireless Telegraph Company, Limited, a high-power Wireless station in North Wales and a sole license to use the vendor Company's patents for direct wireless telegraphic communication between Great Britain and certain stations in the United States of America.

Capital.—Authorised, £200,000 in 200,000 shares of £1 each. Issued, 180,402 shares of £1 each.

BIOGRAPHICAL NOTICES

ABRAHAM, HENRI.—Was General Secretary of the Société Française du Physique from 1901 to 1913. He is now Professor of Physics at the Sorbonne in Paris.

ARCO, GRAF, GEORG VON.—Born at Grossgorschütz, Germany. Educated at Berlin University and the Technical High School, Charlottenburg. In 1898 he was appointed assistant to Professor Slaby in the department of Wireless Telegraphy; later he joined the Allgemeine Elektrizitäts Gesellschaft, Berlin, and in 1903 was appointed manager of Gesellschaft für Drahtlose Telegraphie. He is also a director of the Deutsche Betriebs Gesellschaft für Drahtlose Telegraphie.

AUSTIN, LOUIS WINSLOW, Ph.D.—Was for a time assistant professor of physics at the University of Wisconsin, and later on the staff of Physikalisch-Technische Reichsanstalt at Berlin. It was at this time that he became seriously interested in Wireless Telegraphy, and on his return to America in 1904 he followed up his work begun at Berlin on high temperatures and the discharge of electricity through gases. His early work was specially connected with detectors. One of the most important investigations undertaken by him has been in connection with the development of a method of quantitative measurement of electrical oscillations in the recent antenna. He was recently sent on a mission to study wireless conditions in Europe, and in June, 1912, represented the United States at the International Radiotelegraphic Congress in London. He is at present chief of the United States Radiotelegraphic Laboratory in Washington.

BAKER, T. THORNE.—Born March 19th, 1881. Educated at Mercers' School, London, and passed Intermediate Science examination at the University of London. After five years' work as research chemist he went to Paris in 1907 for the *Daily Mirror* to take up Prof. Korn's system of photo-telegraphy, and superintended the operation of the system between Manchester, Paris, and London.

BANTI, PROF. ANGELO.—Born in Orbetello, Grosseto, Italy, in 1859. After a course of scientific study in Paris he entered

the Rome University, where he took the degree of Doctor in Physics. He practises as a consulting electrical engineer and expert, and acts as scientific adviser to many electrical companies, municipalities, etc. In 1902 he issued various publications on Wireless Telegraphy; in 1903 he published an article relating to his investigations on the singing arc.

BEGGEROW, DR. HANS.—Born September 30th, 1874. Educated at the University of Berlin and Freisburg-breisgan, where he obtained his Doctorate. Since 1901 he has been in the German Admiralty as expert in all matters concerning wireless telegraphy, and since 1906 he has occupied a similar position in the Prussian Army.

BELLINI, DR. ETTORE.—Born at Foligno, Italy, on April 13th, 1876, and educated at Naples University. In 1901 he was appointed Electrical Engineer to the Royal Italian Navy, and in 1906 he became chief of the naval Electrical Laboratory at Venice, in which latter capacity he was responsible for carrying out research work dealing with the employment of Wireless Telegraphy on warships and submarines. Later, in conjunction with Capt. Tosi, he invented the Radiogoniometer, an apparatus for directive Wireless Telegraphy. In 1910 the Bellini-Tosi system was installed at the Boulogne-sur-Mer station of the French Post Office. In 1912 Marconi's Wireless Telegraph Company, Ltd., acquired the patent rights for the construction and commercial development of the wireless compass.

BLONDEL, ANDRÉ E.—Born in Chaumont, France, in 1863, and graduated at the Paris University. He has taken part in notable movements in lighting methods and apparatus, and has been a frequent contributor to learned societies and technical journals on several subjects, including Wireless Telegraphy, in connection with which he invented in 1893 a new apparatus which is known as the "Oscillograph," and which opened a fresh field for the study of alternate currents. He was the first to explain, mathematically, in 1893, the effect of inertia in the hunting of alternators. Among his other work in Wireless telegraphy mention should be made of the following: directed waves produced by a double aerial oscillating on the fifth harmonic, a system of acoustically syntonic wireless telegraphy, etc.

BLONDLOT, PROFESSOR PROSPER RENE.—Born at Nancy in 1849. After completing his scientific studies in Paris he returned to

his native city, where he became Professor at the Faculty of Sciences. He is now a Hon. Professor and Correspondent of the Institute of France. Professor Blondlot has devoted considerable study to the problem of electromagnetic waves, the main object of his researches being to determine the speed of propagation of such waves.

BRANLY, EDOUARD.—Born at Amiens on October 23rd, 1844. He studied at the St. Quentin College, afterwards at Henry IV. College, Paris. He is a Fellow of the University, Doctor of Physical Science, and Doctor of Medicine. Some of his works relate to the electrical conductivity of radio-conductors, and in 1900 the International Jury of Superior Precept Instruction awarded him a *grand prix* for his exhibition of radio-conductors, and the French Minister of Public Instruction made him a "Chevalier of the Legion of Honour" in recognition of the part he has played in connection with the discovery of "Wireless Telegraphy." He has constructed various independent distributing apparatus for producing tele-mechanical effects without wires. In January, 1911, he was elected a member of the Academy of Science, Paris.

BRAUN, PROF. FERDINAND.—Born at Fulda on June 6th, 1850, and studied at Marbourg and Berlin. He has held several academic appointments, and in recent years has devoted his attention to Wireless Telegraphy. In December, 1910, he received (with Mr. Marconi) the Nobel Prize for Physics.

BROWN, SYDNEY GEORGE.—Born in 1873 in Chicago, U.S.A., and brought to England at an early age. He received his education at Harrogate and University, London. He took up the study of submarine telegraphy, and among his important inventions is the drum cable relay and the magnetic shunt. He has also devoted attention to Wireless Telegraphy.

BURSTYN, DR. W.—Born in Austria in 1877, and educated at the University of Vienna. He started his career as an electrical engineer with the Siemens-Schuckert Werke at Charlottenburg, and with the Gesellschaft für Drahtlose Telegraphie.

CHARLTON, CAPTAIN E. F. B.—Is Assistant Director of Torpedoes at the Admiralty, which position carries with it the responsibilities in all matters connected with the design, working, and development of wireless telegraphy at the Admiralty.

CLARKE, E. RUSSELL.—Born in 1871, he was educated at Charterhouse and Pembroke College, Cambridge, where he took a

first-class in the Mathematical Tripos of 1893, and was equally successful in the Mechanical Science Tripos of the succeeding year. He then turned his attention to the Law, and became a barrister of the Inner Temple in 1895. He is attached to the North-Eastern Circuit, specialises in cases of a scientific nature, and has an expert knowledge of the laws on patents, designs, and trade-marks. He is an associate of the Institution of Civil Engineers, an associate and member of council of the Institution of Electrical Engineers, a member of council of the Institution of Automobile Engineers, and a Vice-President of the Wireless Society of London. For the last twelve years Mr. Clarke has been closely interested in the development of wireless telegraphy, and has erected two stations, one in London, and one at Penbydwl, Abergavenny, in Wales.

COHEN, LOUIS.—Born in 1876, he studied electrical engineering in Armour Institute of Technology, 1897-1901, and physics and mathematics in the University of Chicago and Columbia University, 1902-1905. He was on the Scientific Staff of the Bureau of Standards from 1905 to 1909 and Assistant Professor at the George Washington University, 1907-1909. Since 1912 he has been engaged in developing his own inventions in wireless telegraphy, and has had the co-operation of United States Navy Department and their wireless experts in carrying on this work. He is the author of the book "Formulæ and Tables for the Calculation of Alternating Current Problems," and has published about twenty-five scientific and technical papers, some of them dealing with problems in wireless telegraphy and kindred subjects.

CROOKES, SIR WILLIAM, O.M., F.R.S.—Born in London June 17th, 1832, and in 1854 was appointed superintendent of the Meteorological department of the Radcliff Observatory, Oxford. He has carried out a long series of original investigations, and has also published some interesting articles on Wireless Telegraphy.

DE FOREST, DR. LEE.—Born in the United States of America, and graduated at Yale College. He has been identified with Wireless Telegraphy since 1896.

DUBILIER, WILLIAM.—Born at Seattle, U.S.A., on July 25th, 1888. In 1904 he made one of the first amateur Wireless Telegraph apparatus in the United States, and he has since

devoted himself to Wireless Telegraphy and electricity. During recent years he has mainly occupied himself with experiments in Wireless Telephony.

Duddell, W., F.R.S.—Born in London in 1872 and educated privately in this country and in France. He carried out research work at the Central Technical College, London, between 1893 and 1900. In 1908 he read, in conjunction with Dr. E. W. Marchant, a paper on "Experiments on Alternate Current Arcs by the Aid of Oscillographs" before the Institution of Electrical Engineers, and in 1900 he read a paper on "Rapid Variations of Current through the Direct Current Arc." He received a gold medal for oscillographs at the Paris Exhibition of 1900, and at St. Louis in 1904. He is President of the Institution of Electrical Engineers for 1912-1913. He was also a member of the technical committee appointed by the Government in 1912 to consider the question of long-distance wireless telegraphy.

Eccles, W. H., D.Sc., A.R.C.S.—Born in Furness, Lancs., in 1875, and entered the Royal College of Science, South Kensington, in 1894. Three years later he was appointed demonstrator in the Physics Laboratory at the College, and in 1898 he graduated at the London University with first-class honours in Physics. In 1899 he entered Mr. Marconi's laboratory at Chelmsford and spent a great part of his time in the investigation of electrical oscillations of air wires and in "jiggers." He also devised a laboratory method for testing and classifying coherers, and results of a later study of coherers were presented as his D.Sc. thesis. In 1901 Dr. Eccles was appointed head of the department of mathematics and physics at the South Western Polytechnic, Chelsea, and he is now University Reader in Graphics at University, London. He is a member of the Council of the Physical Society and examiner in mathematics at the London University, and secretary of the British Association Committee on Radiotelegraphic Investigations.

Eichhorn, Gustav, Ph.D.—Born at Düsseldorf (Germany) on December 1st, 1867. After leaving the Realgymnasium he took up the study of physics, but this was interrupted by the death of his father, whose paper mills he then entered. For ten years he devoted himself to a business career; then he returned to the profession of his choice and continued his interrupted studies. After three years at Berlin, Munich, and Zürich, he

took the degree in physics (Phil. Dr.) at the last-named University. He was about to enter upon an academical career when unforeseen circumstances again intervened and he was compelled to follow practical pursuits. He entered a wireless telegraph laboratory, and soon after he was appointed manager of experimental stations on the Baltic, where, for about eighteen months he conducted a number of investigations. The results of these are incorporated in a book which was published in England and Germany. He has contributed to various technical journals and has invented a device which is used in connection with wave meters and other instruments. He returned to Zürich in 1905 and introduced wireless telegraphy to the Swiss Military Authorities. Two years later he launched the *Jahrbuch de drahtlosen Telegraphie und Telephonie,* which is now a well-known publication. He is still engaged in practical and theoretical work in wireless telegraphy and telephony.

Erskine-Murray, Dr. James.—Born in Edinburgh on October 24th, 1868, and after a course of six years' study under the late Lord Kelvin at Glasgow University he entered Trinity College, Cambridge, as a research student. In 1898 he was appointed experimental assistant to Mr. Marconi. In 1900 he took up the post of lecturer and demonstrator in physics and electrical engineering at the University College, Nottingham, and in 1905 he was appointed to the lectureship in electrical engineering at the George Coates' Technical College, Paisley. In 1905 he took up consulting work in radiotelegraphy.

Ferrié, Commandant.—He is attached to the department of the Ministry for War, France, and is in charge of the installation at the Eiffel Tower, Paris.

Fessenden, Reginald Aubrey.—Born at Milton, Canada, on October 6th, 1866. Educated at New York and Port Hope, Ontario. In 1886 he was appointed inspecting engineer to the Edison Company, N.Y. In 1892 he took up teaching work and conducted classes in physics and electrical engineering at Western University, and in 1893 he was appointed Professor of Electrical Engineering at Western University of Philadelphia. He has associated himself with the development of Wireless Telegraphy and Wireless Telephony.

Fleming, Dr. John Ambrose, F.R.S.—Born in Lancaster on November 29th, 1849. Educated at University College

School, London; University College; the Royal School of Mines; and St. John's College, Cambridge; Hughes Gold Medallist of the Royal Society. He was appointed demonstrator in mechanics and applied science to the University of Cambridge, and when University College, Nottingham, was opened in 1881 Dr. Fleming was selected as first occupant of the chair of mathematics and physics. He resigned this professorship shortly afterwards to remove to London. In 1885 the Council of the University College, London, created a chair of electrical engineering, and they appointed Dr. Fleming as the first occupant of that chair. Later the bulk of the funds subscribed towards the Sir John Pender memorial was employed to endow the chair of electrical engineering at University College and for the maintenance of the electrical laboratory, subject to the condition that the laboratory should henceforth be known as the Pender Laboratory, and the chair occupied by Dr. Fleming as the Pender Chair of Electrical Engineering. After the incorporation of the University College with the University of London the title of Dr. Fleming's chair was changed to that of Pender Professor in the University of London. In 1912 Dr. Fleming was appointed University Professor of Electrical Engineering in the University of London. He is the author of numerous well-known text-books, amongst which may be mentioned particularly his books on Wireless Telegraphy. He has given many courses of lectures at the Royal Society of Arts and the Royal Institution on Wireless Telegraphy and other subjects.

Flood-Page, Major Samuel.—He has served in military campaigns in India, and besides active service he was occupied with administrative work. On retiring from the Army he devoted himself to business, and one of his achievements which may be mentioned is the introduction of the first incandescent electric lamps into Australia. He joined Marconi's Wireless Co., Ltd., in 1899, as managing director, and still remains a director of the company. Many movements—national, commercial and philanthropic—have found in him an earnest supporter.

Frouin, M.—He is Director of the French Telegraphs and was one of his country's representatives at the International Radiotelegraphic Conference held in London in 1912.

GEOGHEGAN, SAMUEL.—Apprenticed to a firm of mechanical engineers in Birmingham, he has had considerable experience in railway and bridge work in England and various parts of the world. In 1875 he was appointed Chief Mechanical Engineer to Messrs. Arthur Guinness & Co., of Dublin, in whose service he spent 30 years. While with that firm he laid out a system of tram lines in which there was a spiral incline of 120 feet diameter for $2\frac{1}{2}$ turns and a gradient 1 in 40. He is a member of the Institution of Mechanical Engineers, the Midland Institution of Mining, Civil and Mechanical Engineers, the Institution of Civil Engineers of Ireland, and a member of the Council of the Royal Dublin Society. Director Marconi's Wireless Telegraph Co., Ltd.

GLAZEBROOK, DR. R. T., F.R.S.—Born at Liverpool, September 18th, 1854. Educated at Trinity College, Cambridge, where, after taking his degree, he commenced a study of physics at the Cavendish Laboratories under Clerk Maxwell. In 1899 he was appointed by the Royal Society as the first director of the National Physical Laboratory, which position he still holds. He is a member of the technical committee enquiring into the Imperial Wireless Scheme.

GOLDSCHMIDT, PROFESSOR DR. RUDOLF.—Born March 19th, 1876, at Neu-Buckow, Mecklenburg, Germany. After finishing his education at Wiemar Municipal School, he served a commercial apprenticeship, which he left to become apprenticed at the works of an agricultural machinery company; afterwards he studied engineering at Charlottenburg and Darmstadt Technical High School. In Darmstadt he obtained his degree as electrical engineer in January, 1898, and then became assistant to Professor Kittler, in which capacity he lectured in 1899 on "Electric Motors and Their Regulation." In 1900 he obtained the college and travelling scholarship, which enabled him to visit engineering works in Belgium, England, and France. Later in the same year he was appointed engineer in the laboratory of the A.E.G. in Berlin. In 1901-2 he occupied the position of chief laboratory engineer and designer to Kolben and Co., Ltd., in Prague. He came to England in connection with the Willesden Electricity Supply Station, and was later appointed chief engineer to Messrs. Crompton and Co., of Chelmsford. In 1905 he joined the Westinghouse Company

in Manchester. After private preparation he passed the German *abitur*-examination and obtained the degree of Dr. Eng. In 1907 he returned to Germany as lecturer at Darmstadt Technical College. Here he practised as a consulting engineer, and also pursued the development of several inventions, chiefly occupying himself with the invention and design of high-frequency alternators for wireless telegraphy. In 1911 he became manager of the "Hochfrequenz-Maschinen Aktiengesellschaft für drahtlose Telegraphie" in Berlin, a company formed for the utilisation of his inventions in wireless telegraphy. In this position he established two large wireless stations at Eilvesen, Province of Hanover, and Tuckerton, New Jersey, U.S.A., for wireless communication between Germany and America. Since 1899 he has published numerous articles on several different branches of electrical engineering, and has also read two papers before the Institution of Electrical Engineers in London. He has also published a book on "Single-face Commutation motors" and another one on "Standard Qualities of Electrical Machinery."

HOPE-JONES, FRANK.—Chairman of the Wireless Society of London. He was born in 1867, and from 1890 to 1895 he was associated with his elder brother, Robert Hope-Jones, in some of his earliest applications of electricity to organ-building. Since then he has devoted himself almost exclusively to electric clocks, and has established the business of electric time service on a scientific basis, and is the patentee of many inventions constituting the "Synchronome" system of electrical impulse dials. He is a member of the Institution of Electrical Engineers, the British Horological Institution, etc., and is author of numerous contributions to technical journals and to the Proceedings of Scientific Societies.

HOWE, PROF. GEORGE WILLIAM OSBORN.—Born December 4th, 1875, at Charlton, Kent. Educated at Roan School, Greenwich, and at Woolwich Polytechnic. After some industrial experience he joined the teaching staff of the City and Guilds Engineering College, and was later appointed Assistant Professor of Electrical Engineering at the College. He has read several papers on radiotelegraphy before the British Association and the Physical Society, and in 1912 he was awarded the silver medal by the Royal Society of Arts for his paper on "Some Recent Developments in Wireless Telegraphy."

ISAACS, GODFREY C.—Educated in England, France and Germany. He began life in his father's business and at 18 years of age he was manager of the great concern which he had entered as a lad. Young as he was, he not only mastered all the difficult questions connected with the foreign trade, with which his father was chiefly concerned, but as manager he was able to carry on the important correspondence of the business of the firm in the various languages of the leading customers. Added to this, and while at an early age, he, in the course of his extensive travels in all parts of Europe, exhibited great ability in dealing with leading business men of nearly all nationalities. In 1910 he was appointed Managing Director of Marconi's Wireless Telegraph Co., Ltd., and the Marconi International Marine Communication Co., Ltd.

JANET, PAUL.—Professor of Physics at the University of Paris, Director of the Central Laboratory and of the High School of Electricity. He was born on January 10th, 1863, in Paris, and studied at the Lycée Louis-le-Grand and afterwards at the High School. He is a member of the French Society of Physics, of the International Society of Electricians, and of the Society of Civil Engineers of France. From 1886 to 1894 he was Professor of Physics at the University of Grenoble. Professor Janet has published several important works, and from the point of view of Wireless Telegraphy he made a successful experiment in electric resonance by means of high-frequency currents in 1892 for the first time; this is the phenomena used to-day in wavemeters.

JAUREGG, DR. FRIEDRICH RITTER WAGNER VON.—Born on May 8th, 1858, at Wels, Upper Austria. Entered the service of the Austrian Government in 1880, and after many years' service in the postal and telegraph administration in Vienna, was transferred to the Board of Trade, where from 1896 to 1906 he was Chief of the Postal and Telegraph Organisation Staff. Since 1906 he has filled the position of Chief of Section and General-Director of Postal and Telegraph Business, in which position he figures as the chief of the Wireless Telegraph Section.

KENNEDY, SIR A. W. B., F.R.S.—Born in London, March 17th, 1847. He has had great mechanical engineering experience and has been President of the Institution of Civil Engineers and the Institution of Mechanical Engineers. He has de-

signed electric lighting and power stations for many Corporations, and has also been engaged in traction work. He received the honour of knighthood in 1905 on account of his services to the Admiralty. He was a member of the technical committee which was appointed by the Postmaster-General to consider the Imperial Wireless scheme.

KORN, PROFESSOR ARTHUR.—Born at Breslau, Germany, 1870. He is best known as the inventor of a system of telegraphic transmission of photographs, and has published various books on this subject.

LODGE, SIR OLIVER, F.R.S.—Born at Penkhall, Staffs., on June 12th, 1851. He was educated at the Newport (Salop) Grammar School, and was intended for a business career, but being attracted to science he entered University College, London, in 1872, and graduated D.Sc. five years later. He was reader in natural philosophy at Bedford College for Women, then Professor of Physics in University College, Liverpool, before being appointed, in 1900, the first Principal of the new Birmingham University. He was knighted in 1902. He has distinguished himself in various spheres of thought, and his original work includes investigations on lightning, the seat of the electromotive force in the voltaic cell, the phenomena of electrolysis and the speed of the ion, the motion of the ether near the earth, and electromagnetic waves and wireless telegraphy. His patent for syntonic wireless telegraphy has been acquired by the Marconi Co. He presided over the mathematical and physical section of the British Association in 1891 and was President of the Association last year. He has also served as President of the Physical Society and the Society for Psychical Research. He has made many important contributions to the literature of science and has written various books and papers of a metaphysical and theological character.

LORING, COMMANDER F. G.—Is a Captain in the British Navy and is Inspector of Radio-telegraphy to the Post Office.

MADGE, HENRY ASHLEY, B.A., A.M.I.E.E.—Born February, 1879, he was educated at Peterhouse, Cambridge (1898-1902), where he took honours in Mathematics and Mechanical Science (Engineering). From July, 1902, to September, 1903, he was employed by Marconi's Wireless Telegraph Co., Ltd., as junior engineer; from October, 1903, to January, 1904, he was at the Royal Naval College, Greenwich; from

February, 1904, to March, 1905, Naval Instructor in H.M.S. *Vernon;* in April, 1905, he was appointed Expert in Wireless Telegraphy in H.M.S. *Vernon.*

MANDELSTAM, LEONID.—Born May 5th, 1879, in Mogilew, Russia, he studied mathematics and physics at the University of Strassburg under Professor Braun, and in 1902 he was appointed Dr. r.e.r. of Physics at that University.

MARCONI, ALFONSO.—Born at Bologna in 1865, he is about eight years older than his distinguished brother. He was educated at the Bedford Grammar School in England and later at Technical Colleges in Florence and Leghorn. He joined the board of Marconi's Wireless Telegraph Company and the Marconi International Marine Communication Co., Ltd., in July, 1909.

MARCONI, COMMENDATORE GUGLIELMO, LL.D., D.Sc.—Born at Bologna, in Italy, on April 25th, 1874, he is Irish on his mother's side. He was educated at Leghorn and Bologna University, and first began to interest himself in the problem of Wireless Telegraphy in 1895. In the following year he came to England, and took out the first patent ever granted for a practical system of Wireless Telegraphy by the use of electric waves. His first experiments in England were made at Westbourne Park. Shortly afterwards Mr. Marconi saw Sir W. H. Preece, and at his request made some experiments for him and the Post Office officials, between the Post Office and the Thames Embankment. These experiments were highly successful, and Mr. Marconi was requested to make further trials on Salisbury Plain, which also proved satisfactory to the Post Office and to officers of the Army and Navy who witnessed them. Mr. Preece, in December, 1896, delivered a lecture at Toynbee Hall on the subject of "Telegraphy Without Wires," and Mr. Marconi was present and conducted the experiments. Some further experiments were made in May, 1897, in the Bristol Channel, when Lavernock and Flatholm were successfully connected, and afterwards Lavernock and Brean Down, across the Channel, a distance of nine miles. On the invitation of the Italian Government, Mr. Marconi went to Rome and gave a series of exhibitions of the Marconi system at the Quirinal before the King and Queen of Italy and high Italian Government officials, and he subsequently went to Spezia, where his system was put to practical test on board two Italian battle-

ships. A station was erected on land at the arsenal, and the ships were kept in constant telegraphic communication with the shore up to 12 miles from the spot where the apparatus was fixed. The Italian Government, recognising the great value of Mr. Marconi's invention, conferred upon him the honour of knighthood, and are now using his system extensively. On his subsequent return to England Mr. Marconi conducted further experiments at Salisbury (between Salisbury and Bath, a distance of thirty-four miles), and signals were successfully received by Captain Kennedy, who himself erected a set of Marconi instruments at Bath for this installation. On July 20th, 1897, the Wireless Telegraph and Signal Co. Ltd.—now known as Marconi's Wireless Telegraph Co., Ltd.—was established, and two permanent stations were put up—the first at Alum Bay, Isle of Wight. A small steamer was chartered in connection with the experiment here carried out, and fitted with the necessary instruments, the steamer cruising round the coast about Christmas time for several weeks. Although tempestuous weather was experienced no break in telegraphic communication with the station took place. At the beginning of 1898 another permanent land station was put up at Bournemouth and subsequently removed to Poole. The first station was 14½ miles distant across the sea, and the removal to Poole increased this distance to 18 miles. In May, 1898, an exhibition of Wireless Telegraph apparatus was made in the House of Commons and St. Thomas's Hospital. In July, 1898, the Dublin *Express* gave day by day a Wireless Telegraphic report of the yacht races during Kingstown Regatta week, and proved the usefulness and facility with which the system can be applied to commercial purposes. Later Mr. Marconi established communication between the late Queen's residence at Osborne House, Isle of Wight, and the Royal yacht *Osborne,* and Her late Majesty was kept apprised of the progress made by the King during the process of recovery from a serious accident. In the week ending December 24th, 1898, Mr. Marconi was engaged in installing apparatus to provide communication between a lighthouse and a lightship on the South Coast, the Trinity House authorities having placed a room at the South Foreland lighthouse at Mr. Marconi's disposal for the purpose. Mr. Marconi is a member of the Institution of Electrical Engineers, and read a paper on

"Wireless Telegraphy" before the members in 1899. He journeyed to the United States in connection with the America Cup Yacht racing for 1899, between *Columbia* and *Shamrock I.* In the same year a number of the ships of the British Navy were equipped with Marconi apparatus. Early in 1901 telegraphic communication was established between two points more than 250 miles distant, and at the end of that year Mr. Marconi transmitted signals from Poldhu, in Cornwall, to St. John's Newfoundland. A demonstration of the Marconi system was made for the French Government in the early part of 1901, when communication was established and maintained for some time between Antibes, near Nice, and Calvi, Corsica. At the same time the yacht of the Prince of Monaco was fitted with Marconi apparatus. In February, 1902, Mr. Marconi received on board the s.s. *Philadelphia,* in the presence of the officers, good messages on the tape when at a distance of over 1,500 miles from the transmitting station, and signals at over 2,000 miles. In December, 1902, the station established at Cape Breton, Nova Scotia, under a contract with the Canadian Government, for transatlantic Wireless Telegraphy, was put into communication with the Cornwall station at Poldhu, and inaugural messages were transmitted to H.M. the King of England, H.M. the King of Italy, and others, and to *The Times* newspaper, this message for purposes of verification being transmitted in the presence of *The Times* correspondent at Cape Breton, and of the officers of the Italian warship *Carlo Alberto.* In October, 1903, during the voyage of the R.M.S. *Lucania,* Mr. Marconi established communication between this ship and the Marconi stations at Glace Bay, Canada, and Poldhu, Cornwall, England; communication was continued throughout the voyage, and a bulletin published and issued daily to each passenger. At the end of October, 1903, Mr. Marconi, at the invitation of the British Admiralty, sailed on board H.M.S. *Duncan* from Portsmouth to Gibraltar, and throughout the voyage messages were received on board from the Marconi station at Poldhu. Communication was also carried on between the Marconi station on the Rock of Gibraltar and that at Poldhu. In February, 1904, Marconi Wireless Telegraph stations were opened at Broomfield, in Essex, England, and at Amsterdam, in Holland, for

the transmission between the two countries of Press messages and Stock Exchange quotations, these messages being transmitted in Dutch by English operators, having no knowledge of that language, at a speed of from 25 to 30 words per minute, and afterwards published in a leading Dutch newspaper, the *Handelsblad*. On June 4th, 1904, a daily service of wireless news messages all the way across the Atlantic was inaugurated on board the Cunard R.M.S. *Lucania*. On August 3rd, 1904, Marconi Wireless Telegraph stations were opened at Bari, in Italy, and Antivari, in Montenegro, for the purpose of carrying on a public public telegraph service between Italy and the Balkan States. During 1905 a contract was entered into with the Board of Trade for the establishment of Marconi Wireless Telegraphy on the lighthouses and lightships round the coast of the United Kingdom. A powerful station at Clifden, on the West Coast of Ireland, was opened early in 1907, by means of which communication with the American Continent (Glace Bay) has been established, and daily service was maintained until a fire occurred at Glace Bay station on August 21st, 1909. Owing to the fire at Glace Bay the service between that station and Clifden had been suspended, but the work of restoring the installation of new plant, which was superintended by Mr. Marconi, was completed on the 23rd April, 1910, and since that date the service has been working satisfactorily, the messages being distributed thence to all parts of the European and American continents. Mr. Marconi's work has been recognised by many governments and seats of learning; he has been decorated by the King of Italy and the Czar of Russia, is an honorary doctor of many universities, including Oxford, Glasgow, Aberdeen, Liverpool, and Pennsylvania, besides having received the freedom of the principal Italian cities. In 1909 he was accorded what is perhaps the highest distinction that can be obtained by any scientist—the Nobel Prize for Physics. He also holds many other scientific rewards granted by various societies and other institutions.

NORMAN, SIR HENRY, M.P.—He is well known to the public as a politician, a keen traveller, and an accomplished man of letters. Sir Henry has always made the study of electricity one of his hobbies, and has followed the progress of wireless

telegraphy with enthusiasm. He has a private wireless station in the grounds of Honeyhanger, his home at Hazlemere. In 1912 he was appointed Chairman of the War Office Committee considering the use of wireless telegraphy in the field.

OSTHEIM, DR. RUDOLF RITTER SPEIL VON.—Born in 1868, he entered the Austrian State Service in 1892, and after serving in various branches of the post and telegraph department he was appointed in 1896 to the Board of Trade, and since 1908 has been at the head of the administration of the telephone and wireless systems.

OPL, WALTER.—Born in 1879, he became an officer in the Navy in 1897, and in 1910 Lieutenant of a ship of the line on the reserve in order to take up a position as manager of an electro-technical establishment. In 1913 he was appointed representative of the Chief of the Wireless Inspectorate in Trieste.

POULSEN, VALDEMAR.—Born in Copenhagen, November 23rd, 1869. After having studied at the University of Copenhagen, Mr. Poulsen was, in 1893, employed in the Copenhagen Telephone Co.'s technical department, in which he for a number of years superintended electrical testing operations. In 1904, in a paper sent to the Electrical Congress in St. Louis, he explained a method of producing continuous electrical oscillations of a relative high frequency and of a high intensity. He has been assisted by Professor Pedersen in the practical development of this method.

PREECE, LLEWELLYN.—Son of Sir William H. Preece. In 1889 he combined with his father, his brother Arthur Henry Preece, and the late Major Phillip Cardew as consulting engineers. He is now one of the principal partners in the firm of Preece, Cardew & Snell, Consulting Engineers to the Crown Agents to the Colonies, and to the High Commissioners of New Zealand and South Africa. During the last thirteen years he has been largely responsible for the wireless telegraph work in connection with the Crown Colonies, which has been placed in the hands of his firm.

RAYLEIGH, THE RT. HON. LORD.—Born on November 12th, 1842. He was educated at Torquay and at Trinity College, Cambridge. In 1865 he graduated in the Mathematical Tripos as

Senior Wrangler, and was awarded the first "Smith's Prize." His work in Physics has been of a varied and thorough character. He has contributed to the Royal Society some important communications on the "Propagation of Electrical Waves Round the Bend of the Earth."

RIGHI, PROFESSOR AUGUSTO.—Born at Bologna in 1850, and educated at the University there. He was Professor of Physics from 1873 to 1880 at the Bologna Technical Institute; 1880 to 1885 at the Palermo University; from 1885 to 1889 at the Padua University; and since 1890 at the Bologna University. Professor Righi has published many important papers on physics, among which may be mentioned "Hertzian Waves," in 1900; "Telegraphy Without Wires" (in collaboration with B. Dessau), in 1902, etc.

SANKEY, CAPTAIN H. RIALL.—Born at Nenagh in Ireland in 1853 and educated in Switzerland and at the Royal Military Academy, Woolwich, and the School of Military Engineering, Chatham. He had a distinguished career in the Royal Engineers before retiring from the Army to devote himself entirely to engineering work. He is a director of Marconi's Wireless Telegraph Co., Ltd.

SALTZMAN, MAJOR C. McK.—He is a native of the State of Iowa, and graduated at the United States Military Academy at West Point in 1896. As a Cavalry officer he participated in the battles near Santiago de Cuba of the Spanish-American War of 1898, and later as a Signal Officer participated in the Philippine Insurrection in the Philippine Islands. In 1901 he was transferred to the Signal Corps of the U.S. Army, and has since been identified with the electrical, cable and radio work of the U.S. Army. Major Saltzman for several years has been in charge of the Electrical Laboratory of the Signal Corps in Washington, where radio equipment of the U.S. Army is designed and tested. He represented the United States at the International Radiotelegraphic Conference in London in June, 1912.

SAUNDERS, HENRY SPEARMAN.—Born April, 1841, he is the son of the Hon. Frederick Saunders, who was Treasurer of Ceylon, to which office the latter was succeeded by his eldest son, Sir Frederick Richard Saunders, K.C.M.G. Mr. Henry S.

Saunders joined his parents in Ceylon at the age of 18, and he devoted himself with conspicuous ability and success to the public and commercial life of the colony. He was for two years Chairman of the Planters' Association. He was also instrumental in carrying through important schemes of railway extension and the construction of roads, and his services in the latter respect gained for him the appreciation of the Director of Public Works. On returning to England about thirteen years ago Mr. Saunders joined the board of Marconi's Wireless Telegraph Co. He accompanied Mr. Marconi to America on board the ss. *Philadelphia* in 1902, and he was one of the first directors of the Marconi International Marine Communication Co., Ltd.

SEGERS, M. PAUL.—Minister of Railways, Marine, Posts and Telegraphs of Belgium, was born at Antwerp on October 12th, 1870. He studied at the University of Louvain, and obtained his doctorate of law in 1893. He was elected to the Chamber of Representatives in 1900, and has given particular attention to maritime matters. In 1913, when the Ministry of Marine was created in Belgium, M. Segers was appointed at its head and the result has been most fortunate. He has found ample scope for the display of initiative and an outlet for his untiring activity. Recently the control of Railways and Posts and Telegraphs was added to the department of which M. Segers is chief.

SWINBURNE, JAMES, F.R.S.—Born at Inverness on February 28th, 1858, and educated at Clifton College. He has had a wide experience, and as far back as 1881 he was employed by Messrs. J. W. Swan & Co. to organise their lamp factory in Paris; later he went on a similar mission to America. He has practised as a consulting engineer since 1894, and has attained considerable eminence in various branches of science. As an expert on wireless telegraphy his fame has been recognised by the Government, who in 1912 appointed him a member of the Technical Committee considering the Imperial Wireless Scheme. He is also a member of various scientific societies, and is on the Council of some. In 1902-3 he was President of the Institution of Electrical Engineers.

SWINTON, ALAN A. CAMPBELL.—Born in 1863, he commenced his career in 1882 in the famous Elswick Works of Armstrong, Whitworth & Co., and two years later succeeded to the

position of Electrical Engineer to the Company. He has devoted considerable attention to scientific research, including wireless telegraphy, and is President of the Wireless Society of London.

THYS, COLONEL ALBERT.—He has been intimately associated with wireless telegraphy ever since its inception as a commercial possibility, and is a director of Marconi's Wireless Telegraph Co., Ltd., La Compagnie de Télégraphie Sans Fil and the Deutsche Betriebs Gesellschaft für Drahtlose Telegraphie m.b.H.

TISSOT, CAPTAIN C.—Born at Brest in 1868, he entered the Naval School in 1884, taking up the study of science. Later he was appointed to the Chair of Physics at the Naval School. As Captain of Frigate, he is now chief of the technical research department at the Central Naval Laboratory in Paris. He was one of the first to devote himself to the study of Wireless Telegraphy in France and has been largely instrumental in its technical development as well as its application to the French Navy. On the purely scientific side, Captain Tissot has carried out some valuable experiments to secure exact measurements in Wireless Telegraphy. He has also studied problems concerning detectors and made investigations concerning the practical applications of Wireless Telegraphy and Telephony. It is due to Captain Tissot's initiative and to his efforts at the Bureau des Longitudes in Paris in 1907 that the Eiffel Tower service of time signals was established in 1910.

TRAVAILLEUR, MAURICE.—Born at Brussels in 1871 and graduated as engineer at Brussels University in 1893. At the age of 26 he was appointed electrical engineer to the late King of the Belgians. He was one of the founders of La Compagnie de Télégraphie Sans Fil in 1901, of which he is now managing director, besides being on the Boards of Marconi's Wireless Telegraph Co., Ltd., and the Deutsche Betriebs Gesellschaft für Drahtlose Telegraphie, and other companies.

TURPAIN, PROFESSOR ALBERT.—Born at La Rochelle on December 2nd, 1867, he was employed in the Department of Posts and Telegraphs of France from 1884 to 1887. In 1888 he became a licentiate in physical science, and three years later a licentiate in mathematics, obtaining his doctorate of science

in 1889. Since 1894, when, as a tutor of physics at the Faculty of Science at Bordeaux, he succeeded in sending messages by means of Wireless Telegraphy from the equipment which was erected in the college buildings, he has experimented in Wireless Telegraphy with successful results. He applied himself to the question of tuning and in 1899 he experimented with a means for determining the direction of electromagnetic waves; he took up these experiments again in 1912. In 1911 he succeeded in obtaining graphic records of time signals by means of a micro-ampere-meter over a distance of 300 km. between Poitiers and Paris. He carried out successful experiments in recording photographically wireless telegraph signals which passed between Paris and Poitiers.

WALTER, L. H., M.A., A.M.I.E.E.—Born in London in 1870, and educated at private schools in England and at Hanover, Germany; also at Trinity College, Cambridge (1894-1898), where he took honours in Natural Sciences. He then became experimental assistant to Sir Hiram S. Maxim. In 1903 he was appointed Editor of *Science Abstracts*, when that publication was taken over by the Institution of Electrical Engineers, which position he still holds. He has invented several forms of detectors of electrical oscillations. In 1905 he drew attention to the advantages of directive Wireless Telegraphy, and, associating himself with Captain Tosi and Dr. Bellini, at that time making their first experiments, he introduced the directive system, and the wireless compass, into England. The acquisition of the patents by the Marconi Co. followed.

WEHRENALP, KARL BARTH EDLER VON.—Born 1857. Was first engaged as railway engineer; in 1888 he entered the Austrian Postal and Telegraph Service. Since 1904 he has been Chief Engineer of this department and he is at the head of all technical matters connected therewith.

WIEN, PROFESSOR MAX.—Born at Königsberg in 1866. He made a special study of the subject of physics under Helmholtz and others and assisted Rontgen from 1891 to 1893. He is at present at the University of Jena and has devoted considerable attention to the study of electromagnetic waves and their propagation.

Winkler, Captain Eugen.—Born in 1875, he entered the service of the Austrian State in 1895 and is an officer of the Navy. Since 1900 he has been employed in the telegraph department of the Navy, and in 1911 he became a Lieutenant of a vessel of the line and was entrusted with the organisation of the Government Wireless service. In 1912 he became the Chief of the Wireless Telegraph Inspectorate in Trieste and took over the management of the newly installed wireless stations.

Zenneck, Professor J.—Born April 15th, 1871, in Wurtemburg. The son of a clergyman, he was intended for a similar career, and studied for four years in a Theological College at Tübingen. While at Tübingen he studied mathematics and natural history, particularly zoology, from 1889 to 1894, and in the latter year he passed the State examination in these subjects; he obtained his doctorate in 1894. After a course of natural history studies in London and elsewhere he devoted himself entirely to physics and from 1895 to 1899 he was an assistant in the Physical Institute in Strassburg. In 1899 to 1900 he was engaged in making tests with Wireless Telegraphy in the North Sea. Five years later he became lecturer and assistant professor of Physics in the Technical College, Dantzic, and in 1906 he was appointed professor of Physics at the Technical College, Brunswick. This position he vacated in 1909, when he joined one of the largest mechanical works in Germany, and in 1911 he returned to Dantzic as professor of the Technical College, a position which he still holds with distinction.

OBITUARY.

Preece, Sir William H., F.R.S.—Born 1834, died November 7th, 1913. Particulars of Sir William's career were published in the Year Book, 1913, p. 538.

Slaby, Professor Adolf.—Born 1850, died April 6th, 1913. With Count Von Arco he developed the Slaby-Arco system, which, together with the Braun-Siemens, formed the basis of the Telefunken system.

LITERATURE OF WIRELESS TELEGRAPHY AND TELEPHONY.

THE literature upon the subject of wireless telegraphy and telephony has now become so large that the following collection of representative books and journals should be found useful. The bibliography is by no means complete, but we think that few, if any, of the important works are not included. In addition, there are the reports of the various International Radiotelegraphic Conferences and the "Nomenclature" issued by the Berne Bureau.

THE BOOKS MENTIONED IN THE FOLLOWING PAGES AND OTHERS CAN BE OBTAINED, AT THE PUBLISHED PRICE, FROM THE MARCONI PRESS AGENCY, LTD., MARCONI HOUSE, STRAND, LONDON, W.C., ON RECEIPT OF REMITTANCE AND COST OF POSTAGE.

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***A History of Wireless Telegraphy.** By J. J. FAHIE. Pp. 348. Wm. Blackwood & Sons, London. Dodd, Mead & Co., New York.

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The Wireless Age. New York.: 456, Fourth Avenue, N.Y. City. 15 cents monthly.

Electrical World. New York. 10 cents weekly.

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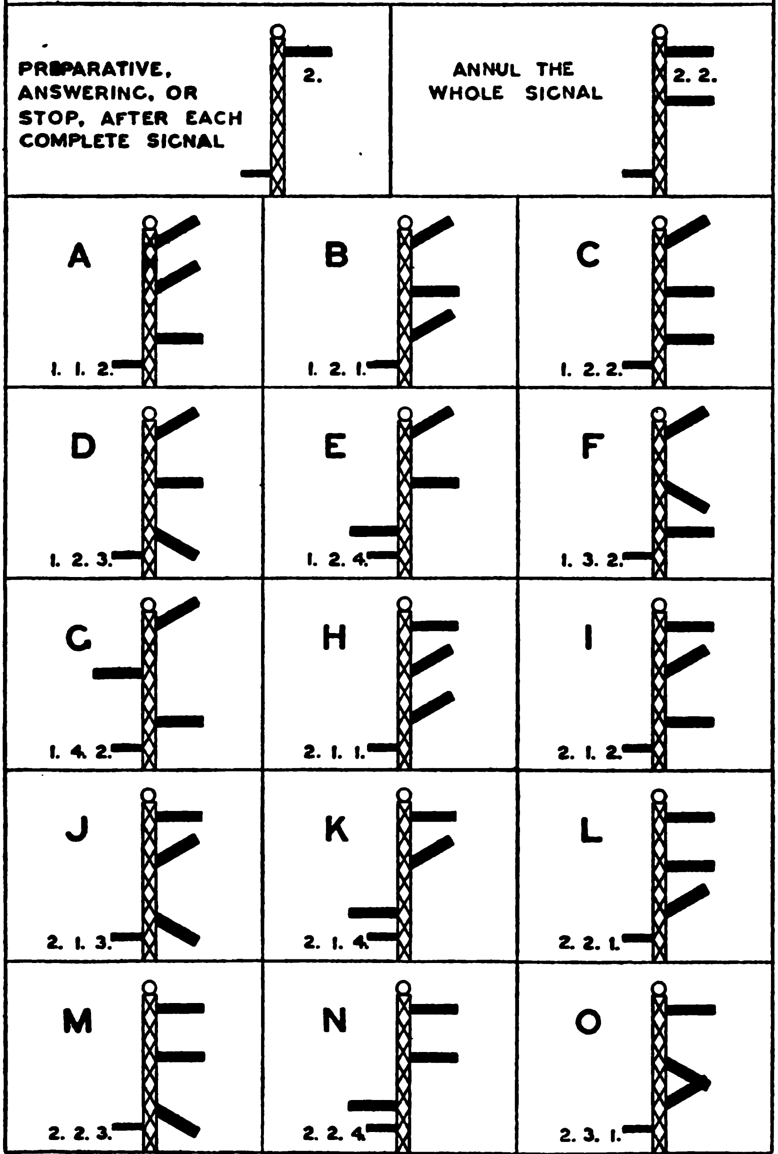
In the following pages are shown general alphabetical tables for making international code signals by means of the fixed semaphore, and signals by means of the British movable semaphore. Through the courtesy of Messrs. James Brown and Son, Glasgow, we are able to reproduce from "Brown's Signalling" tables showing the British method of semaphoring by hand flags. In the British method, the person intending to semaphore makes the international code signal V O X, "I am going to semaphore to you," and sets his semaphore at the alphabetical signal, with the indicator out, and waits until the ship to which the semaphore signal is to be made hoists her answering pennant "close up." Then he will proceed with the communication by spelling, making a momentary pause between each sign or letter; the arms are to be dropped between each word or group, the indicator only remaining out.

Should the answering pennant be dipped by the person taking in the signal, the last *two* words are to be repeated until the answering pennant is again hoisted "close up," which denotes that the person taking in the semaphore signal is ready to read and write down the signal. It is to be dipped when a word is lost, and the person making the signal is then to repeat the *two* last words until the answering pennant is hoisted again "close up."

The British method of semaphoring by flags held in the hand which is shown is exactly the same as the British movable semaphore system, the positions of the apparatus which denote the letters, numbers, and special signs being identical in each case, the only difference being in the apparatus employed.

The French method of semaphoring by hand flags is based on the same principle as the British method, but the positions in which the flags are held to denote the letters, etc., are different.

GENERAL ALPHABETICAL TABLE FOR MAKING THE INTERNATIONAL CODE SIGNALS BY MEANS OF DISTANT SIGNALS BY FIXED SEMAPHORE.



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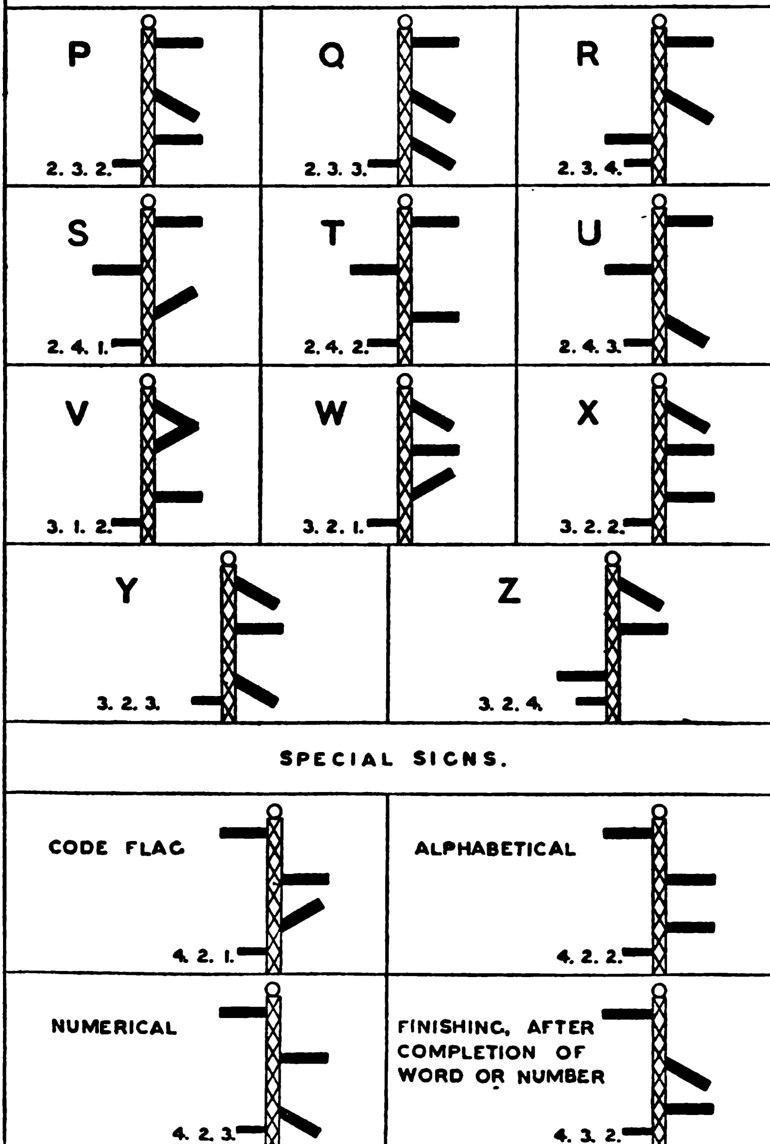
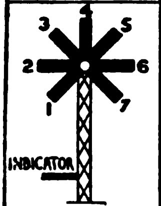
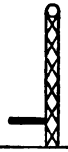
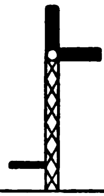
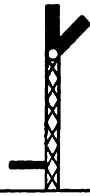
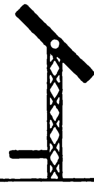


SEMAPHORE SIGNS	COVERNING SIGNS			
				
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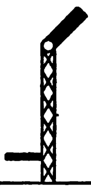
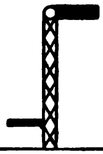
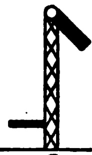
SIGN				
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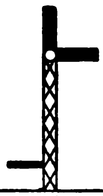
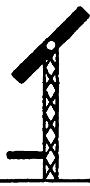
SIGN				
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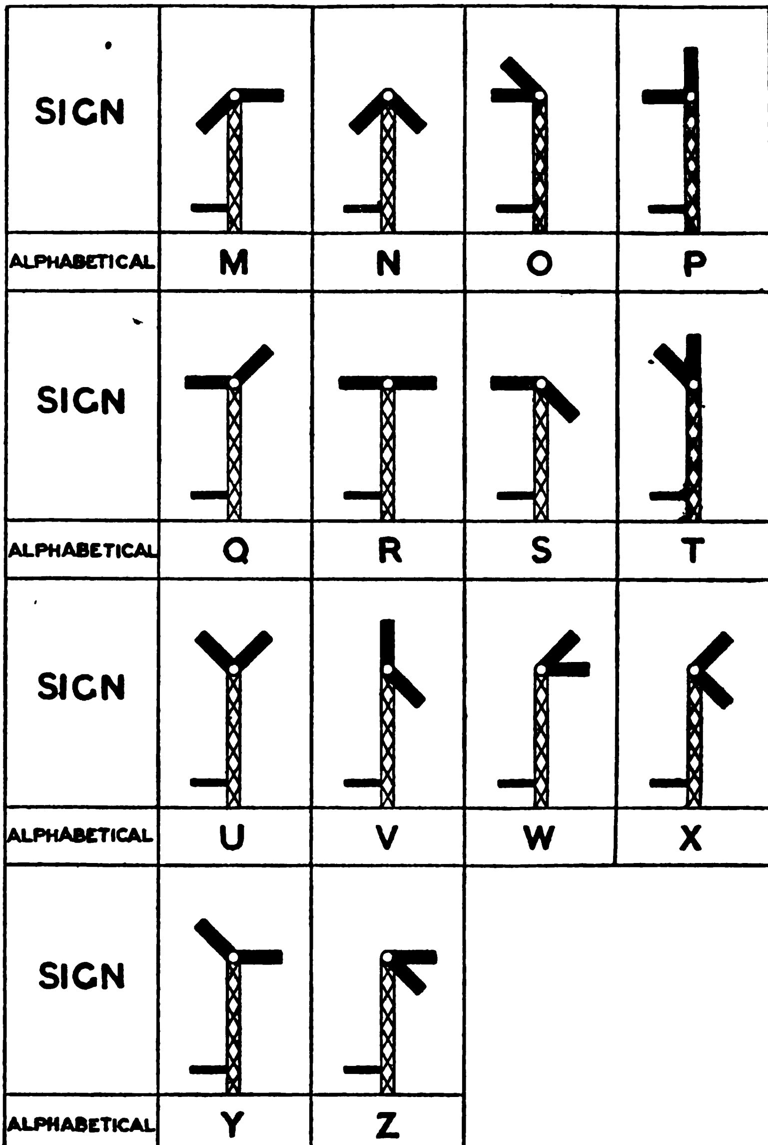
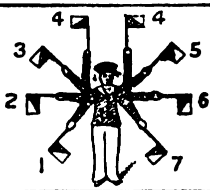
NOTE.— IF A NUMERICAL SIGNAL IS TO BE FOLLOWED BY WORDS, THE END OF THE NUMERICAL SIGNIFICATION OF THE SIGNS IS SHOWN BY THE ALPHABETICAL SIGN BEING MADE, INDICATING THAT SPELLING IS AGAIN TO COMMENCE



NOTE.— IF A NUMERICAL SIGNAL IS TO BE FOLLOWED BY WORDS, THE END OF THE NUMERICAL SIGNIFICATION OF THE SIGNS IS SHOWN BY THE ALPHABETICAL SIGN BEING MADE, INDICATING THAT SPELLING IS AGAIN TO COMMENCE.



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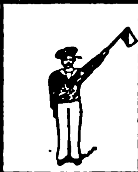
SIGN				
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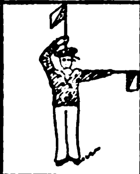
SIGN				
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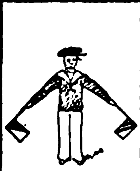
SIGN				
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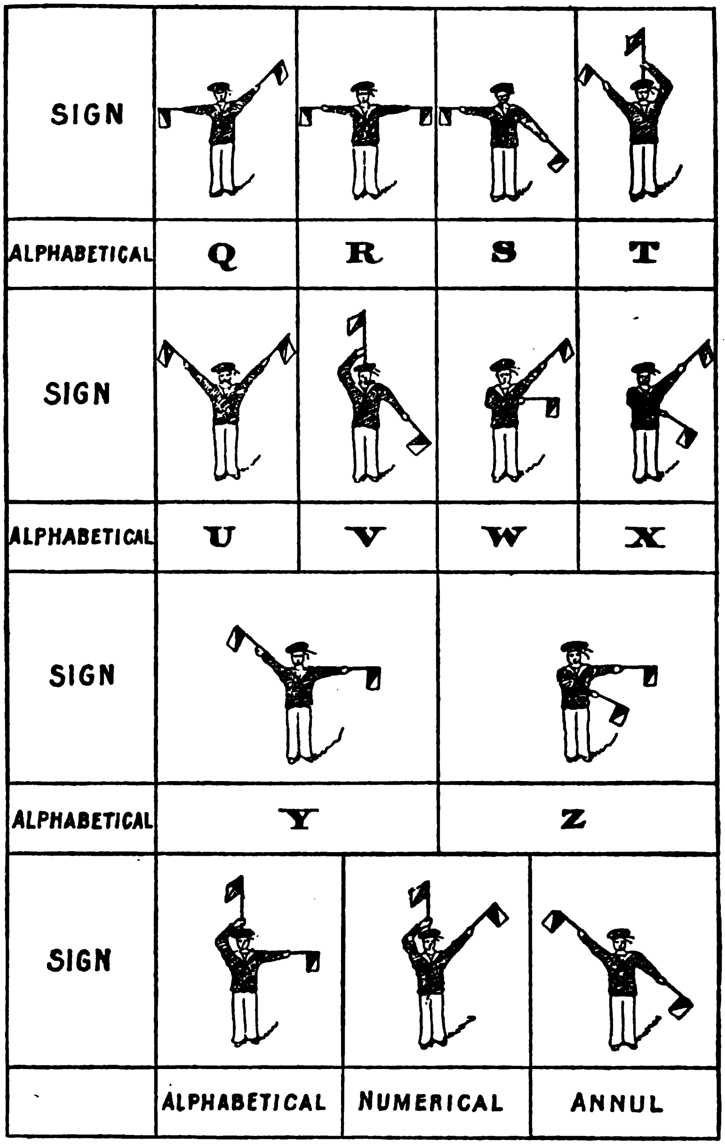

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THE Society of Lloyd's has, with the sanction of Parliament, the control and working of signal stations in Great Britain and Ireland and in many places abroad. Various foreign Governments have also recognised the advantage of reports from signal stations and semaphores being universally collected and forwarded on identical conditions. These have arranged that reports from or to their semaphores can be obtained or forwarded through Lloyd's.

The charges for forwarding information from or transmitting advices by means of signal stations are moderate. Shipowners, charterers, merchants, or consignees can obtain telegraphic intelligence with regard to any vessel in which they may be interested, or postal advices if so preferred, or can transmit orders to such vessels by communication with Lloyd's.

Harbour and dock authorities, Chambers of Commerce, Exchanges, and such institutions that may require a large number of reports, can arrange with Lloyd's for receiving full and regular advices from Lloyd's signal stations on moderate terms. When a number of reports are taken a substantial reduction is made in the fees. Shipowners or others who wish to be supplied with reports of vessels from any signal stations are requested to communicate with the Secretary of Lloyd's, London, E.C.

An arrangement has been concluded with Marconi's Wireless Telegraph Co. and the Marconi International Marine Communication Company, by which all maritime intelligence received by wireless telegraphy at any station worked by either of these companies, including Poldhu and similar stations primarily used for shore-to-shore or overland telegraphy, shall forthwith be communicated to Lloyd's. Masters of vessels equipped with wireless apparatus are accordingly requested to forward to the nearest wireless telegraph station any maritime intelligence—*e.g.*, wrecks, derelicts, casualties, vessels in distress, etc., with a view to its being forthwith communicated to Lloyd's. No charge for transmission will be made against vessels for such messages, therefore masters are requested to communicate such intelligence as freely as possible. The following Lloyd's stations in the United Kingdom are fitted with wireless apparatus :—

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Fastnet.	Brow Head.
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Malin Head.	Inishtrahull.

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The Morse code as used by all countries except America is called the "Continental Morse," and is a dot and dash system throughout, with a maximum of four elements in any letter; an element is either a dot or a dash.

Whatever the speed at which signals are sent, the following rules must be remembered and strictly adhered to:

A dash is equal in length to three dots.

A space between two elements in a letter is equal in length to one dot.

The space between letters in a word is equal in length to a dash.

The space between words in a sentence is equal in length to two dashes.

THE EUROPEAN OR CONTINENTAL MORSE CODE.

a	· —	m	— —	z	— — · ·
ä	· — · —	n	— ·		
á or å	· — — · —	ñ	— — · — —		Numerals.
b	— · · ·	o	— — —	1	· — — — —
c	— · — ·	ö	— — — ·	2	· · — — —
ch	— — — —	p	· — — ·	3	· · · — —
d	— · ·	q	— — · —	4	· · · · —
e	·	r	· — ·	5	· · · · ·
é	· · — · ·	s	· · ·	6	— · · · ·
f	· · — ·	t	—	7	— — · · ·
g	— — ·	u	· · —	8	— — — · ·
h	· · · ·	ü	· · — —	9	— — — — ·
i	· ·	v	· · · —	0	— — — — —
j	· — — —	w	· — —	.	· · · · · ·
k	— · —	x	— · · —	?	· · — — · ·
l	· — · ·	y	— · — —	!	— — · · — —

AMERICAN MORSE CODE.

A	· —	N	— ·		Numerals.
B	— · · ·	O	· ·	1	· — — ·
C	· · ·	P	· · · · ·	2	· · — · ·
D	— · ·	Q	· · —	3	· · · — ·
E	·	R	· · ·	4	· · · · —
F	· — ·	S	· · ·	5	— — —
G	— —	T	—	6	· · · · · ·
H	· · · ·	U	· · —	7	— — · ·
I	· ·	V	· · · —	8	— · · · ·
J	— · — ·	W	· — —	9	— · · —
K	— · —	X	· — · ·	0	— · · · —
L	——	Y	· · · ·	.	· · — — · ·
M	— —	Z	· · · ·	?	— · · — ·
				!	— — — ·

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BUCHAREST	Marcel Porn, Str. Eroului 7, bis
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CONSTANTINOPLE	Stock & Mountain, Stamboul
COPENHAGEN	Sophus Berendsen, Ltd., G. L. Torv 24
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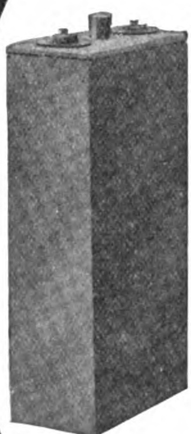

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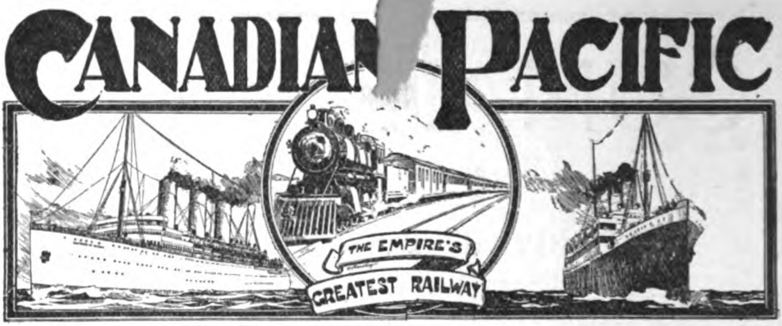

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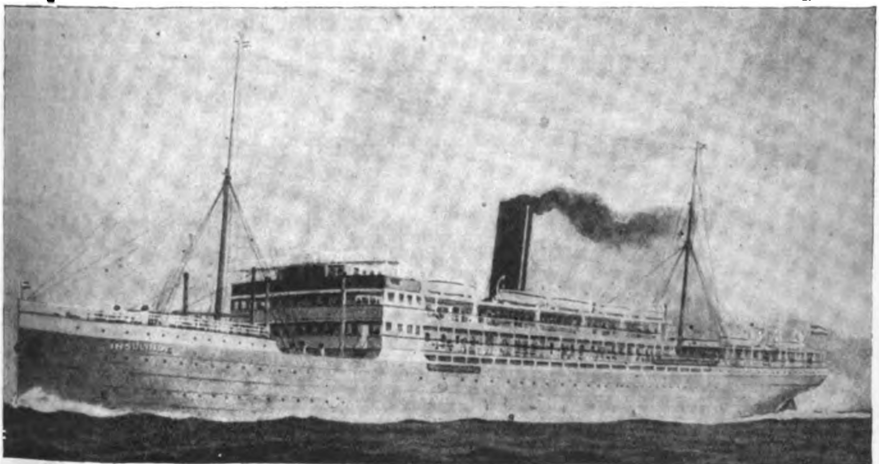

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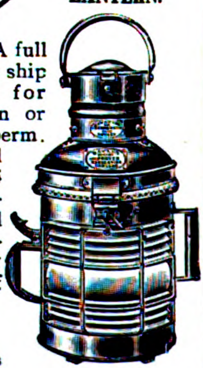
A full size ship lamp for paraffin or mineral sperm, with a powerful light showing at 5 miles or more. Specially designed for and recommended by the ADMIRALTY COMMITTEE ON SIGNALLING AT SEA (copy of Report sent on application).

Price in strong Copper, **70/-**

" Galv. Steel, **50/-**

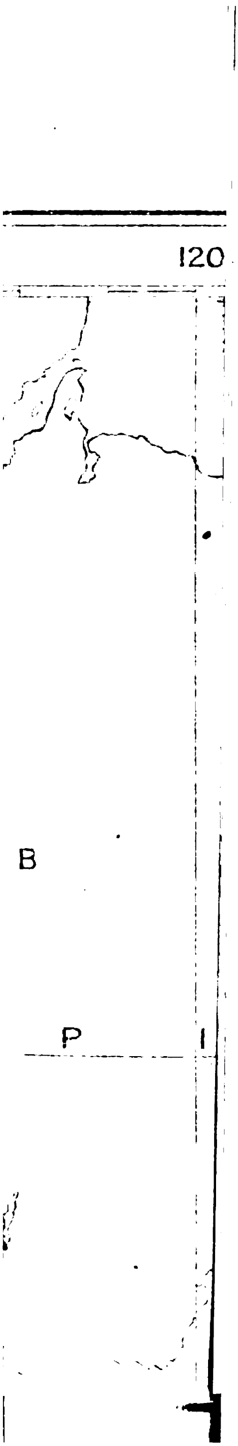
No. 222 can be fitted for electric light as well as oil if required, at **77/6** and **57/6** each.



No. 222.

DAVEY & CO. LONDON, LTD. 66 West India Dock Rd., LONDON, E.

TELEGRAMS: "ACDAV, LONDON." TELEPHONE: EAST 1836.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